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Twenty-Eighth Annual Report

of the

State Board of Health

of the

STATE OF OHIO

For the Year Ending December 31

1913

COLUMBUS, OHIO:
THE F. J. HEER PRINTING CO.
1914.
Bound at the State Bindery.

LETTER OF TRANSMITTAL.

Ohio State Board of Health.
OFFICE OF SECRETARY.

Columbus, May 15, 1914.

To His Excellency, James M. Cox, *Governor of Ohio.*

Sir: — In accordance with Section 1248 of the General Code, the accompanying report, which is for the calendar year 1913, is herewith submitted for your consideration and for publication.

Respectfully,

E. F. McCampbell, M. D.,
Secretary and Executive Officer.

MEMBERS OF THE OHIO STATE BOARD OF HEALTH.

	TERM EXPIRES.
John W. Hill, C. E., Cincinnati	1916
H. T. Sutton, M. D., Zanesville	1917
Josiah Hartzell, Ph. D., Canton	1914
R. H. Grube, M. D., Xenia	1915
Wm. T. Miller, M. D., Cleveland	1918
H. C. Brown, D. D. S., Columbus	1919
Oscar Hasencamp, M. D., Toledo	1920
Timothy S. Hogan, *Attorney General*	1915
Eugene F. McCampbell, Ph. D., M. D., *Secretary*	Indefinite

GENERAL REPORT.

This is the twenty-eighth report of the State Board of Health, and is for the year ending December 31, 1913.

PERSONNEL OF THE BOARD.

There has been one change in the personnel of the Board since the last report. H. C. Brown, D. D. S., of Columbus, was appointed in May, 1913, to succeed Dr. Frank Warner, of Columbus, whose term expired in December, 1912.

MEETINGS.

Eleven meetings were held during the year, ten regular and one special meeting. May 22d, a special meeting was held in the office of the Secretary, Columbus. This special meeting was called due to the fact that Mr. John W. Hill, Engineering Committee, had found it impossible to review and report upon matters of an engineering nature owing to a great stress of work incident to investigations of flood conditions.

CONFERENCES WITH LOCAL BOARDS OF HEALTH.

Three conferences were held with local boards of health during the year. The first was held at Columbus in January, with representatives of boards of health of municipalities of 3,000 or more inhabitants. The second conference was held at Columbus in July, with representatives of boards of health from townships and villages of a population less than 3,000 in northern Ohio, and the third was held at Cincinnati in October, with such representatives from southern Ohio. Interesting addresses and discussions were presented at these conferences pertinent to public health work, and many of these were later published in the *Monthly Bulletin* and distributed among public health officials and others interested in sanitary matters.

DIVISIONS OF THE DEPARTMENT.

The work of the State Board of Health is divided into seven divisions, as follows: Administration, Engineering, Hygienic Laboratories, Communicable Diseases, Plumbing Inspection, Tuberculosis, and Survey of Occupational Diseases. Since the last report the Division of Tuberculosis and the Division and Survey of Occupational Diseases have been added. The reports of the various divisions may be found on subsequent pages.

DIVISION OF ADMINISTRATION.

The Division of Administration, which is under the immediate direction of the Secretary, concerns itself in the main with general public health administration. All the correspondence with the 2,200 agencies in the state on matters dealing with public health work in general is taken care of by this division. During the past year there has been a decided increase in the general correspondence of the division with health boards, health officers and citizens of the state. This would seem to indicate an increased interest on the part of the public in matters pertaining to the protection of the general health.

The division is also concerned with the enforcement of the rules and regulations of the State Board of Health and the state laws on this subject. All records and reports are compiled and filed by this division. Licenses for conducting maternity boarding houses, permits for the removal of the dead, etc., are issued by this division. The Division of Administration also has charge of the general work of all the other divisions of the Department and all matters of general policy.

DIVISION OF ENGINEERING.

The Division of Engineering has supervision over all proposed and existing water supplies in the state, as well as sewerage systems, sewage treatment plants and plants for the disposal of refuse. On subsequent pages may be found reports on water supplies and sewerage, and water and sewage purification plants, considered by the Board during the year.

The division is also engaged in giving advice to the various communities of the state with regard to general matters of sanitary engineering. During 1913 the work of this division has been markedly increased. In addition to the regular lines of work, various members of the engineering staff have undertaken problems of original research along lines of sanitary engineering. Especial mention should be made of the original work recorded by the engineering department in connection with the special report on the flood of March, 1913. Many original determinations will be found in this report.

WATER SUPPLIES AND SEWERAGE.

Plans for new or additional water supplies were acted upon by the Board during the year in the following places: Akron, Alliance, Athens, Athens State Hospital, Baltic, Barberton, Centerburg, Colonial Heights (Akron), Frankfort, Geneva, Glouster, Granville, Hubbard, Kenmore, Kenton, Lima State Hospital, Magnolia, Ohio State Sanatorium (Mt. Vernon), Nelsonville, Ravenna, Rossford, Sandusky, Swanton, Westerville and Youngstown.

Plans for sewerage were acted upon for the following places: Arlington Heights, Bedford, Bexley, Boardman (Boardman Centralized

School), Celina, Clinton Township (Private Sewer), Conneaut, District No. 1, Convoy (High School Building), Coshocton, Cincinnati (Duck Creek, Madisonville District, and Mill Creek District), Cincinnati (Pleasant Ridge and Kennedy Heights), Cincinnati (Westwood District), Cleveland (Andrew Schell Sub-division No. 2), Cleveland (Renker Avenue S. W.), Columbiana (Revised plans), East Palestine, Farmdale, Franklin County, (Sewer District No. 1, near Columbus), Fremont, Gallipolis, Greenfield, Interstate Stock Yards Company (Toledo), Lima, Lorain (District C), Lucas County (Rugby Place, Main Sewer District No. 1), Lucas County (Main Sewer District No. 2), Lucas County (Local Sanitary Sewer No. 1, Main Sewer District No. 2, Gradolph Avenue, West Toledo), Lucas County (Main Sewer District No. 3), Lucas County (Sub-District No. 3, Main Sewer Distrist No. 3), Lucas County (Beverly Place, Main Sewer District No. 3), Mantua, Marysville, Maumee, Michigan Central Railroad Company (Toledo), Mt. Vernon, Newburgh Heights, New Straitsville, Oak Harbor, Port Clinton, Ripley, Sandusky, Toledo, Vermilion, Wapakoneta and Westerville.

The Board acted upon plans for the purification of water of Conneaut, Painesville, Lima State Hospital, Rossford and Steubenville.

The Board also acted upon plans for the purification of sewage at Akron, Bexley, Boardman (Boardman Centralized School), Canal Dover, Canton, Celina, Clinton Township (Private Sewer), Convoy (High School Building), Cleveland (Andrew Schell Sub-division No. 2), Cleveland (Renker Avenue S. W.), Columbiana (Revised Plans), Columbus (Proposed Methods of Disposal of Sewage Sludge), East Palestine, Farmdale, Franklin County (Sewer District No. 1), Granville (Proposed Change of Location), Interstate Stock Yards Company (Toledo), Lakeside, Lucas County (Sub-District No. 3, Main Sewer District No. 3), Maplebeach Hotel (near Cleveland), Marysville, Michigan Central Railroad Company (Toledo), Mt. Vernon, Newark (Grant Street and Stevens Street Schools), New Philadelphia, Sandusky, Shelby, Vermilion, Westerville and Willoughbeach Park (near Cleveland).

BENSE PROPOSITIONS.

During the year 1913 the Board issued the following orders under this Act:

The city of Akron was ordered to install and have in operation prior to June 1, 1915, sewage treatment works.

The village of Caldwell was ordered to install a new water supply of satisfactory quality prior to November 1, 1914.

The city of Cambridge was ordered to install a new water supply of satisfactory quality, or a water purification plant to improve the quality of the existing water supply prior to January 1, 1915.

The city of Canton was ordered to install and have in operation prior to January 1, 1915, the necessary sewers and a new sewage treatment plant.

The village of Chardon was ordered to install and have in operation prior to January 1, 1915, a system of sewerage and a sewage treatment plant.

The village of Cuyahoga Falls was ordered to install and have in operation prior to January 1, 1915, necessary sewers and sewage treatment works.

The city of East Liverpool was ordered to install a water purification plant, satisfactory to the State Board of Health, prior to January 1, 1915.

A supplemental order was issued to the city of Fostoria, granting an extension of time until September 1, 1914, for the completion of a sewage treatment plant.

The Board of Commissioners of Franklin County was ordered to install and have in operation prior to July 1, 1914, sewage treatment works.

The city of Ironton was ordered to install and have in operation a water filtration plant, of a design satisfactory to the State Board of Health, on or before eighteen months after the approval of the order by the Governor and Attorney General (April 23, 1913).

The city of Lakewood was ordered to provide sewage treatment works, satisfactory to the State Board of Health, prior to June 1, 1915.

The city of Painesville was ordered to install water purification works, of a design satisfactory to the State Board of Health, and to have same in operation prior to January 1, 1914.

A supplemental order was issued to the village of Plymouth, granting an extension of time of six months from the 13th day of May, 1913, within which to purify the present water supply or to secure a new water supply, satisfactory to the State Board of Health.

The city of Toledo was ordered to install and have in operation within two years from the date of approval of the order by the Governor and Attorney General (August 25, 1913), the necessary intercepting sewer and sewage treatment works to correct the conditions existing in Swan and Ten Mile creeks, caused by the discharge of sewage from the city of Toledo.

The Woodsfield Water Company was ordered to install a water purification plant, of a design satisfactory to the State Board of Health, prior to January 1, 1914.

DIVISION OF HYGIENIC LABORATORIES.

The State Board of Health maintains a fully equipped hygienic laboratory. As is shown by the report of this division on subsequent pages, the work has materially increased during the year. Physicians and citizens of the state are using the laboratory more extensively than in years past. In addition to investigations of a routine character which have been carried on during the past year, problems of original research have been investigated. Especial mention should be made of the investigation on the subject of diphtheria, by Mr. Berry, a member of the staff of the Division of Hygienic Laboratories. The chief of the division has also made investigations on typhoid fever and an epidemic of sore throat. All these investigations have been reported in the *Monthly Bulletin* of the State Board of Health.

DIVISION OF COMMUNICABLE DISEASES.

This division is concerned principally with the investigation of the various epidemic diseases. As shown by the report on subsequent pages, the work of this division has materially increased during the year 1913.

There has been no unusual prevalence of epidemic diseases, with the exception of smallpox of a very mild type, which has prevailed in certain sections of Ohio rather extensively during October, November and December. The extreme mildness of the disease has made it rather difficult to control. Additional assistance will be necessary in this division during the coming year if the work continues to increase.

During 1913 the division also conducted an extensive original study of acute poliomyletis. The complete report of this investigation has been published in the *Monthly Bulletin*.

DIVISION OF PLUMBING INSPECTION.

This division is concerned principally with the administration of the sanitary sections of the Ohio State Building Code dealing with plumbing. A detailed report may be found on subsequent pages.

It has been absolutely impossible for this division to handle the work which the law requires. If this work is to be carried on and a high degree of efficiency obtained, additional assistance will be necessary.

Attention is directed to the recommendations in this report with regard to public comfort stations, drinking fountains, and changes in the law relative to fees and inspection.

DIVISION OF TUBERCULOSIS.

As indicated previously, the Division of Tuberculosis is a new division of the Department. The State Board of Health felt that inasmuch as approximately 7,000 people are dying annually in the state from tuberculosis, and inasmuch as there are at least 35,000 cases of this disease in the state, some intensive consideration should be given this problem. The Board also appreciated the fact that the problem which presented itself was one of medico-social character. It seemed desirable to make an investigation of the conditions underlying the spread of this disease, to secure reports of all cases to local health departments, and to take steps to provide hospital care for the majority of those afflicted. It was appreciated at the outset that a campaign of education was a very essential part of the plan to solve this problem.

This division was established in May, 1913. A trained social worker was placed in charge of the work of this division. Since the time of its organization the division has conducted a rather extensive and far-reaching educational campaign through the medium of the public health exhibit. It has also been active in the installation of visiting nurses in the various communities of the state, in the collection of statistics as to the prevalence of the disease, and in the securing of district hospitals for the care and treatment of cases of the disease. A detailed report of the work of this division may be found on subsequent pages.

DIVISION AND SURVEY OF OCCUPATIONAL DISEASES.

House Joint Resolution No. 12, passed at the regular session of the General Assembly of 1913, directed the State Board of Health to make an investigation of the prevalence of occupational diseases in the state. There was accordingly established a division in the Department to make this survey. The division was established in May of 1913, and has been conducting an extensive investigation of the various industries in the state. Definite recommendations for legislation will be made at the next regular session of the General Assembly in January, 1915.

The report of this division will be found on subsequent pages of this report.

MONTHLY BULLETIN.

Considerable attention has been given during the past year to the *Monthly Bulletin,* published under the auspices of the State Board of Health. The aim has been to include in the material published in this *Bulletin,* articles of a semi-scientific nature on public health topics which will be of interest and afford instruction to the local health agencies, as well as to provide material of a more or less popular nature which would be of value in the education of the general public on matters pertaining to health conservation. The *Bulletin* has materially enlarged until it occupies, during this, the year 1913, 1,235 pages. It has been made an interesting magazine on public health and compares very favorably with the publications of other state departments.

MINUTES OF THE SECRETARY

RESUMÉ OF SECRETARY'S REPORTS.

JANUARY MEETING
1913

The regular monthly meeting of the State Board of Health was held in the office of the Secretary, at 8 p. m., January 22, 1913.

Those present were Drs. Hasencamp, Grube, Sutton, Miller and Warner, and Mr. Hill.

Mr. Henry C. Taylor, of Columbus, Mr. G. W. Williams and Mr. M. E. Brown, of Bexley, owners of property near the site proposed for treatment works for the sewage of Bexley appeared before the Board to enter protest against the location of the works at the site selected. It was claimed that to locate the works at this point would result in depreciating the value of the property in the neighborhood and that the proposed boulevard system would be interfered with. Petitions were also presented, signed by other residents of the vicinity.

The matter was referred to executive session.

Mr. Lewis E. Mallow, assistant prosecuting attorney of Lucas County, and Mr. Wm. H. Gould, consulting engineer for the commissioners of Lucas County; and Mr. R. B. Wiltsie, president of the Wiltsie Realty Company, appeared before the Board to urge action in the matter of declaring the necessity for sewerage in District No. 3, Lucas County, and sewers and sewage treatment works for Sub-District No. 3 of said Main Sewer District No. 3. The question of necessary legislation was discussed and the plans of the county commissioners and the realty company were explained.

The matter was referred to executive session.

Mr. F. D. Chamberlin, mayor; Mr. Dewitt C. Jones, village solicitor; Mr. A. Elliott Kimberly, consulting engineer, and Mr. F. L. Chase, of Bexley, asked for a hearing on the protest against the location of the proposed sewage treatment works for that village. Mr. Jones stated that efforts had been made to get permission to connect the village sewers with the Columbus sewer system, but the city would not enter into such agreement. He further stated that the site selected was the least objectionable that could be obtained with the money available and that they had no hopes of being able to find a site where objections would not be raised.

Mr. Kimberly explained the character of the plant to be installed and said that the plant could be installed and operated without danger of offensive conditions being created.

The matter was referred to executive session.

Mr. J. H. Orgill, attorney, and Dr. Wm. F. Rohland, a bacteriologist, representing clients interested in toilet supply houses in Cleveland, asked for a hearing on a proposed regulation covering the use of the common drinking cup and the common towel.

Dr. Warner moved that consideration of this matter be postponed until the next meeting. Seconded by Mr. Hill.

Dr. Sutton moved to amend the motion by giving an immediate hearing. Seconded by Mr. Miller.

Dr. Warner withdrew his motion, with Mr. Hill's consent, and the hearing was given. The representatives stated that they had under way certain tests by which they hoped to show that such a regulation was not necessary and asked that time be given them to complete the tests and bring their data to the attention of the Board. The proposed regulation was read by the Secretary and the Board informed that the regulation as drafted did not interfere with the interests of the clients represented and no protest would be made to immediate action by the Board.

The matter was referred to executive session.

The Board then went into executive session.

It was moved by Dr. Grube and seconded by Mr. Hill to approve the minutes of the December meeting.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Warner and Miller.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Miller to approve the monthly report of the Secretary with the exception of the regulation concerning the use of common drinking cups and common towels.

The other recommendations in the report were as follows:

1. That ophthalmia neonatorum be made a reportable disease.

2. That Elmer E. Boehm, extra clerk employed in the laboratory, be transferred to the position of laboratory helper in place of Calvin Robinson, resigned; and that Ralph F. Alvord be permanently employed as extra clerk in the laboratory to take special care of the preparation and distribution of outfits, the salaries to remain as before.

3. That Mrs. Marie Game be employed as stenographer, to take the place made vacant by the resignation of Miss Schofield.

4. That the following purchases be made:

6 Desk lights, at approximately $7.00 each.
1 Underwood Typewriter No. 5 model, $40. Credit for old machine, $43.03.
A Farm Yard Well Model, at a cost of $50.00.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary then read rules recommended by him governing the use of the common drinking cup and common towel, as follows:

Rule I. That common carriers shall not provide in cars, vehicles, vessels or conveyances operated in traffic within the State, or in depots, waiting rooms or other places used by passengers traveling to various parts of the State, any drinking cup, glass or vessel for common use; and that no school, church, hotel or public building in the State shall provide any drinking cup, glass or vessel for common use; PROVIDED, That this regulation shall not be held to preclude the use of drinking cups, glasses or vessels which have been thoroughly cleansed by washing in boiling water after use by each individual, nor shall it be held to preclude the use of sanitary devices for individual use only;

Rule II. That common carriers shall not provide in any car, vehicle, vessel or conveyance operated in traffic within the State or in depots, waiting rooms or other places used by passengers traveling to various parts of the State, any towel for use by more than one person; and that schools, churches, hotels and public buildings in the State shall not provide any towel for use by more than one person, PROVIDED, That this regulation shall not be held to preclude the use of towels that have been sterilized in boiling water after use by each individual, nor shall it be held to preclude the use of a sanitary towel for individual use only.

On motion of Mr. Hill, seconded by Dr. Miller, these rules were adopted.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Miller, Sutton and Warner.

In the negative, none.

Dr. Miller moved to instruct the Secretary to confer with the Attorney General with reference to extending the rules so as to include other classes of buildings where the common drinking cup and common towel are used. This motion was seconded by Dr. Warner.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

On motion of Mr. Hill, seconded by Dr. Sutton, the report of the Finance Committee was approved, this being a statement of expenditures from December 1, 1912, to and including January 15, 1913, and a statement of balances available on January 16, 1913.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary made a report upon an investigation made by him of the present method of distributing antitoxin and recommended that the Board discontinue its relations with the H. M. Alexander & Company, of Marietta, Pa., March 1, 1913, and adopt the plan as submitted by the H. K. Mulford Company, of Philadelphia.

It was moved by Dr. Sutton and seconded by Dr. Warner to adopt the recommendation of the Secretary.

Mr. Hill presented his report, as Engineering Committee, and the matters were taken up in the following order:

It was moved by Dr. Sutton, and seconded by Dr. Miller, to approve the recommendation of the special committee, Dr. Hasencamp and the chief engineer, Mr. Dittoe, that the Board declare the necessity for sanitary sewerage for Main Sewer District No. 3, Lucas County, by the adoption of the following resolution:

WHEREAS, The board of county commissioners of Lucas County, Ohio, pursuant to the provisions of Section 1 of an act of the General Assembly of the State of Ohio, passed May 31, 1911, approved June 8, 1911, and entitled "An Act authorizing the Board of County Commissioners of the several counties of the state to provide for the construction of sewers outside of the municipalities and to provide for the cost and expense thereof," have laid out and established Lucas County, Ohio, Main Sewer District No. 3 within that portion of Lucas County which lies within three miles of the city of Toledo, to-wit:

The lots and lands in that part of Town. 3, United States Reserve of 12 miles square at the foot of the rapids of the Miami of Lake Erie, in Lucas County, Ohio, and being within the following described boundaries, to-wit:

Beginning at a point where the north line of River Tract 16 intersects the northwest shore of the Maumee River; thence westerly along said north line of the River Tract 16 to the center line of the Miami and Erie Canal; thence southwesterly along said center line of the Miami and Erie Canal to its intersection with the east and west center line of River Tract 16; thence westerly along said east and west center line of River Tract 16 to the center of the Monroe Turnpike (Detroit Avenue, so-called); thence northeasterly along the center line of the Monroe Turnpike (Detroit Avenue, so-called) to the center of Glendale Avenue; thence easterly along the center line of Glendale Avenue to the east line of Section 16; thence southerly along the east line of Section 16 to the northwest shore of the Maumee River; thence southwesterly along the northwesterly shore of the Maumee River to the place of beginning, and,

WHEREAS, Upon investigation, this Board finds that one or more main sewers are necessary in the above described district; therefore, be it

Resolved, That pursuant to the provisions of Section 2, of an act of the General Assembly of the State of Ohio, passed May 31, 1911, approved June 8, 1911, and entitled, "An Act authorizing the Board of County Commissioners of the several counties of the state to provide for the construction of sewers outside of the municipalities, and to provide for the cost and expense thereof," it is necessary to construct one or more main sewers in said Main Sewer District No. 3, and, be it further

Resolved, That the Board of County Commissioners of Lucas County, Ohio, is hereby respectfully requested to have prepared the necessary plans and specifications for a main sewer or sewers and sewage treatment works in Lucas County, Ohio, Main Sewer District No. 3 and submit the same to this Board for approval.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton to refer the question of the site for proposed sewage treatment works for Bexley, to Dr. Frank Warner, member, as a committee, for an investigation and report to the Board at the next regular meeting.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton to approve the plans for a proposed water purification plant for Woodsfield, submitted by the W. J. Sherman Company, of Toledo, January 18, 1913, subject to the following conditions:

1st. That samples of all filtering material be submitted to the engineer of the State Board of Health before the material is placed;

2nd. That a rate controller of a type satisfactory to the engineer of the State Board of Health be installed;

3rd. That an auxiliary coagulant feed line be installed to provide for application of the coagulant at the outlet end of the coagulating basin; and,

4th. That this approval shall be void unless the proposed plant shall have been installed prior to January 1, 1914.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Miller to approve the general plans for proposed sewage treatment works for Canal Dover, prepared by Mr. George E. Arnold, city engineer, and Mr. R. Winthrop Pratt, consulting engineer, submitted January 16, 1913, subject to the following conditions:

1st. That detailed plans of the sewage treatment works incorporating all features be submitted to the State Board of Health before contracts are awarded for construction of the works;

2nd. That samples of all filtering material for the contact and sludge filters be submitted to and receive the approval of the engineer of the State Board of Health before being placed;

3rd. That the city council appoint a competent operator to have charge of the plant, whose duties shall also include superintendence of the sewerage system; and,

4th. That this approval shall be void unless contracts for the installation of the proposed works shall have been made prior to July 1, 1913.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Warner, and seconded by Dr. Sutton, to approve a proposed new water supply for the Ohio State Sanatorium, to be obtained from two drilled wells located near the power house of the institution and to be developed according to a plan received from Dr. S. A. Douglass, superintendent, January 6, 1913, subject to the following conditions:

1st. That the sewer line leading from the power house be examined and if found to be in a leaky condition, be replaced with a line of cast iron pipe to a distance of 500 feet from the wells; and,

2nd. That this approval shall be void unless the proposed new supply shall have been installed prior to September 1, 1913.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Sutton, and seconded by Dr. Miller, to grant the request of the council of Arlington Heights, transmitted by Mr. A. J. Orth, village clerk, January 7, 1913, for an extension of the time limit of the Board's approval of a proposed system of sanitary sewers for that village, given April 11th and revised July 18, 1912, and to revise the third condition of the said approval to read "That this approval shall be void unless contracts for the construction of the proposed sewers shall have been made prior to July 1, 1913."

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Miller, and seconded by Dr. Sutton, to disapprove the proposed additional water supply for Swanson, to be obtained from a well 82 feet deep located on Mechanic Street immediately north of George Street; and to advise the local authorities to secure a supply from wells at a more satisfactory location as regards the proximity of sources of pollution.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Miller, and seconded by Dr. Sutton, that the Board finds, after consideration of the report of its chief engineer upon sewerage conditions at Greenville, that the city of Greenville has failed to comply with the order of the State Board of Health, issued January 4, 1909. directing the said city to purify its sewage in a manner satisfactory to the said Board on or before October 1, 1909, and that a copy of the said report and findings of the Board be furnished to the Attorney General with a request that he institute such legal proceedings against the city officials of Greenville as he may deem proper.

Those voting in the affirmative were: Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Grube, and seconded by Dr. Miller, to approve the plans and specifications for proposed sewerage and sewage treatment works for Mantua, prepared by Mr. John S. Mallette, of Ravenna, engineer for the village, and submitted by Mr. C. R. Bowen, village clerk, December 11, 1912, subject to the following conditions:

1st. That immediately after the completion of the sewerage system and sewage treatment works all connections conveying domestic sewage to the existing storm sewers be discontinued and connections to the sanitary sewers established; and that the council by ordinance satisfactory to the Secretary of the State Board of Health regulate the proper use of sanitary and storm sewers;

2nd. That the treatment works be installed and ready for operation before any connections to the sanitary sewers are permitted;

3rd. That the village council appoint a competent superintendent of sewers, whose duties shall also include supervision of the operation of the sewage treatment works;

4th. That the valves on all by-pass lines at the works be provided with locks, the keys to be kept in the custody of the mayor or health officer of the village; and that the valves shall not be opened without notifying the State Board of Health at least twenty-four hours before such opening; and,

5th. That the design of the treatment works be modified as follows:

a. By the provision of apparatus for the disinfection of the effluents from the intermittent and sludge filters, such apparatus to be used at all times;

b. By providing a cover or housing for the dosing chamber;

c. By omitting the ventilators for the sand filters;

d. By increasing the sludge filter area to at least 3,000 square feet;

6th. That samples of all filtering material be submitted to and receive the approval of the Engineer of the State Board of Health; and,

7th. That this approval shall be void unless revised plans satisfying Condition No. 5 shall have been submitted to the State Board of Health prior to May 1, 1913, and the sewerage system and sewage treatment works installed prior to January 1, 1915.

Also that the Secretary be instructed to advise the engineer of the village that the following revisions in the plans for the treatment works are desirable and will aid in the operation and add to the efficiency of the works:

1. An increased slope of the floors of the sedimentation tanks;
2. Provision of proper handles securely attached to the lift valves in the sludge drains;
3. Provision of a cover for the sedimentation tanks;
4. Provision of a drain leading from the dosing chamber;
5. Provision of vitrified salt glazed bell and spigot sewer pipe for underdrains in the filters; and,
6. Provision of an intermediate layer of gravel 4 to 6 inches in

thickness $\frac{1}{8}$th inch to $\frac{1}{4}$th inch in size between the sand and coarse gravel in the filters.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

Mr. Hill recommended that the authorities be further advised that in taking this action the State Board of Health carefully considered the proximity of the proposed new water supply for the city of Akron which is to be taken from a reservoir formed by a dam eleven miles below the outlet for the proposed treatment works; and that the Board would emphasize the danger of pollution of this water supply by the effluent for the proposed sewage treatment works unless the works are operated efficiently at all times; that of especial importance is the use of a disinfectant to provide a high degree of purity of the effluent, and that it be understood that the approval of the Board is not in effect until the foregoing conditions have been complied with.

It was moved by Dr. Miller and seconded by Dr. Sutton that the plans for proposed systems of sanitary and storm water sewers and sewage treatment works for the village of Celina, submitted by the W. J. Sherman Company, consulting engineers, January 18, 1913, be approved subject to the following conditions:

1st. That the proposed sewage treatment works be constructed before any connections to the sanitary sewers are permitted;

2nd. That the village council enact an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers, and providing for a proper official to supervise the maintenance of the sewers and treatment works; and that within two months after the completion of the sanitary sewers and treatment works, all existing sanitary connections to storm water sewers be abandoned;

3rd. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

4th. That the treatment works be enlarged or otherwise modified when required by the Staate Board of Health; and,

5th. That this approval shall be void unless the proposed works shall have been installed prior to January 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Warner, after consideration of a report of the chief engineer upon the pollution of the Sandusky River by the sewage from Bucyrus, that the Board finds from this report that the sewage of Bucyrus is being discharged in an unpurified state into the Sandusky River and by reason thereof is so corrupting said river as to create conditions detrimental to the health and comfort of persons living along the stream below the city; and furthermore, that such discharge of sewage endangers the water supplies of the cities of Upper Sandusky, Tiffin and Fremont.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Warner that the Board insist upon the city of Bucyrus immediately undertaking improvements of the present conditions, and that the Secretary be instructed to cite a committee of the officials of Bucyrus, including representatives of the council, to appear before the Secretary and the Chief Engineer of the Board to state what steps will be taken to improve conditions, and in the event of failure of the city to take action prior to March 1, 1913, to carry out the improvements ordered by the State Board of Health December 6, 1910, that the report and findings of the Board be referred to the Attorney General with a request that he institute legal proceedings against the said officials.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Sutton, after considering a report of the chief engineer of the Board upon an investigation of the public water supply of Bellaire, that the Board finds from said report that the public water supply of Bellaire is constantly subject to dangerous contamination and is unfit without purification for domestic purposes.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was then moved by Dr. Grube and seconded by Dr. Sutton that the Secretary be instructed to cite representatives of the city of Bellaire to appear before the Secretary and the chief engineer of the Board to state what steps will be taken to secure an improvement of the water supply, and in the event of the failure of the city to make such installations, repairs and changes as are necessary to place the water purification works in readiness for use before March 1, 1913, that the report and findings of the Board be transmitted to the Attorney General with a request that he institute legal proceedings against the officials of the city of Bellaire.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Sutton that a proposed additional water supply for Kenton, as shown on plans received from Mr. W. P. Steffen, director of public service, November 5th and

12th, 1912, to be obtained from two drilled wells 200 feet deep, located approximately 1000 feet and 2300 feet south of the pumping station, be approved subject to the following conditions:

1st. That the city council pass an ordinance, approved by the Secretary of the State Board of Health before its passage, providing that all privy vaults and cesspools within 500 feet of either well be removed or made water-tight, and preventing the future establishment of any leaching privy vault, cesspool, or other source of pollution within that distance; and,

2nd. That this approval shall be void unless the said ordinance shall have been passed and a certified copy of the same filed with the Secretary of the State Board of Health prior to March 15, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Sutton to disapprove the supply obtained from the open dug well installed in 1896 by the city of Kenton, and to direct the city to abandon this supply; and to withhold approval of the supply obtained from drilled wells near the pumping station installed illegally in 1906 and 1910 and to furnish the city officials a copy of the report on the proposed additional water supply with the following advice:

1st. That the water supply obtained from the open dug well near the pumping station is subject to danger of pollution by leachings from privy vaults in the vicinity;

2nd. That the direct connection between the dug well and drilled wells near the pumping station suggests the danger of pollution of the latter wells;

3rd. That the water obtained from all sources in use is excessively hard and contains iron in objectionable quantities; and,

4th. That with a view to obtaining a permanent water supply satisfactory in quantity and quality the city should have a comprehensive study of all available sources made and recommendations as to the proper procedure submitted.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Grube that the request of the director of public service of Cincinnati, of December 31, 1912, for permission to omit the construction of the proposed sewage treatment works for Pleasant Ridge and Kennedy Heights and to establish a temporary outlet into Duck Creek, be granted subject to the following conditions:

1st. That the temporary outlet be located down stream from the proposed location at least 500 feet below Madisonville Road;

2nd. That plans satisfactory to the State Board of Health providing for an intercepting sewer following Duck Creek, and for proper disposal of the sewage be prepared and submitted to the State Board of Health;

3rd. That this approval shall be void unless the said plans shall have been submitted prior to October 1, 1913; and,

4th. If the discharge of sewage from the proposed temporary outlet should cause a decided nuisance in Duck Creek, the city of Cincinnati shall immediately remedy this in a manner satisfactory to the State Board of Health without regard to the time when plans for the proposed intercepting sewer are to be submitted.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Miller to approve the general scheme for sewerage for Sub-district No. 3, Main Sewer District No. 3, Lucas County, subject to the following conditions:

1st. That comprehensive plans for sewerage and sewage treatment for Main Sewer District No. 3 be submitted to the State Board of Health by the County Commissioners of Lucas County prior to July 1, 1913;

2nd. That before any connections to the sewers in Sub-district No. 3 are permitted, a sewage treatment plant of a design satisfactory to the State Board of Health be constructed;

3rd. That such treatment plant be utilized for a period not to exceed one year, at the end of which time the plant shall be abandoned and removed and the sewage treated in a plant to be constructed by the county commissioners of Lucas County to serve Main Sewer District No. 3; and,

4th. That this approval shall be void unless the proposed sewerage for Sub-district No. 3, Main Sewer District No. 3 Lucas County, and sewage treatment works for the same shall have been constructed prior to July 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Sutton to disapprove the plans for proposed sewerage and sewage treatment works for Sewer District No. 1, Franklin County, submitted by Messrs. Burgess and Long, consulting engineers, January 18, 1913, and to inform the county commissioners and the consulting engineers that while the general design of the sewerage system is satisfactory, a revision of the design of the treatment works will be required to incorporate some secondary process of treatment of the sewage.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented a resolution, adopted by the council of the village of Rocky River on January 2, 1913, asking the State Board of Health to investigate the contamination of the Rocky River by the sewage and other wastes from the city of Lakewood.

It was moved by Dr. Grube and seconded by Dr. Sutton that a committee consisting of Dr. Miller and the chief engineer be appointed to investigate and report upon this complaint.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented the request of Miss Ida Prickett, 639 West 6th Street, Cincinnati, for a renewal of her license to conduct a maternity boarding house and lying-in hospital, providing for the care of two women and two children.

It was moved by Mr. Hill and seconded by Dr. Warner that this license be renewed.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented the resignation of Miss Margaretta Schofield, stenographer; and of Mrs. Grace Champion, stenographer in the plumbing inspector's department.

On motion of Dr. Warner, seconded by Dr. Grube, these resignations were accepted.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

Dr. Hasencamp announced that he had appointed Dr. James G. Cullen of Toledo, medical inspector for that district.

On motion of Dr. Sutton, seconded by Dr. Miller, this appointment was confirmed. Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary read a resolution adopted by master plumbers, journeymen plumbers and inspectors in session January 2nd-4th, 1913, in regard to the necessity of additional plumbing inspectors, and stated that a member of the General Assembly proposed to introduce a bill which would provide for additional inspectors and would also give the Board the benefit of fees collected for inspections.

On motion of Dr. Warner, seconded by Dr. Sutton, the proposed legislation was approved.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented a requisition for additional filing cases and supplies for the Engineering Department and recommended their purchase, as follows:

600 Press board, metal tip guides, correspondence size, No. 6050 M., plain blank labels, 3 ds. @ $6.25	$37 50
500 Press board, metal tip guides, legal size, plain blank labels, 3 ds., No. 6250 M. @ $9.25	46 25
3 No. 97104 new golden oak, four drawer plain units @ $17.00	51 00
1 No. 90701 new golden oak top, 24-inch @ $4.25	4 25
1 No. 90802 new golden oak, high leg base unit, 17½ inches high, @ $7.50	7 50
Total	$146 50

On motion of Dr. Sutton, seconded by Mr. Hill this purchase was authorized.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The chief engineer verbally discussed the report of a conference comprising officials of the United States and Canada and the various states bordering the Great Lakes, held at Buffalo, December 17, 1912, with the International Joint Commission. The report of this conference contains answers to four questions submitted to it by the International Commission, two of which relate to the points of sampling of the Great Lakes and analytical determination to learn the pollution. The various states represented at the conference were asked to criticise the answers to these questions. Before the State Board of Health can intelligently criticise these answers it is necessary that the Board be informed more fully of the scope and intention of the investigation, what is expected of it and how the work is to be carried on by other states and provinces interested.

On motion of Dr. Miller, seconded by Dr. Warner, it was voted to refer the matter to a committee consisting of Mr. Hill, Dr. Miller, the chief engineer and bacteriologist, with instructions to report at the next meeting.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary was instructed to correspond with the officials of other states with reference to this matter.

The chief engineer made a statement relative to the condition of Swan Creek and Ten Mile Creek at Toledo.

On motion of Mr. Hill, seconded by Dr. Miller, the matter was referred to a committee consisting of the President, Dr. Hasencamp and the chief engineer, Mr. Dittoe, to report at the March meeting of the Board, to be held at Toledo.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented a list of health officers, who had been reappointed by their respective councils to serve in lieu of a board of health.

It was moved by Dr. Sutton and seconded by Mr. Hill to approve these health officers.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented a list of new health officers appointed by their respective councils to serve in lieu of a board of health.

It was moved by Dr. Grube and seconded by Mr. Hill to approve these health officers, unless protested.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

On motion of Mr. Hill, seconded by Dr. Miller, it was voted to hold the next regular meeting in Cincinnati, Thursday, February 20, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

On motion of Dr. Miller, seconded by Dr. Grube, the Board adjourned.

Attest: E. F. McCampbell, M. D.,
Secretary.

Approved February 20, 1913.

FEBRUARY MEETING

1913

The regular monthly meeting of the State Board of Health was held at the Havlin Hotel, Cincinnati, at 8 P. M., February 20, 1913.

Those present were Drs. Hasencamp, Grube, Miller, Warner, Mr. Hill and Mr. Joseph McGee, First Assistant Attorney General.

On motion of Mr. Hill, seconded by Dr. Grube, the minutes of the January meeting were approved.

Those voting in the affirmative were Messers. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

On motion of Mr. Hill, seconded by Dr. Grube, the report of the Finance Committee was approved, this being a statement of expenditures from January 16, 1913, to and including February 15, 1913, and a statement of balances available on February 16, 1913.

Those voting in the affirmative were Messers. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

On motion of Mr. Hill, seconded by Dr. Warner, the monthly report of the Secretary was approved.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

Mr. C. H. Sidener, president of the Union Publishing Company, of Cincinnati, asked permission to make a statement to the Board in regard to the anti-tuberculosis educational campaign being conducted by that company. This consists of the distribution of literature, comprising principally the prize essay prepared by Dr. S. A. Knopf in 1900. Mr. Sidener requested the Board to endorse their plan for the distribution of this pamphlet among working men and women. The matter was discussed by the members of the Board with Mr. Sidener and he was informed that the Board would not lend its aid to a commercial proposition such as proposed, and that the State, through the State Board of Health, would look after the distribution of such literature as was deemed advisable.

Mr. A. E. Jones, vice-president of the Loveland Citizens Elictric Company, appeared before the Board with reference to a request for information concerning the installation of duplicate pumping machinery at the water works plant. He explained that the pump and motor now in use were in good condition and that it was not necessary to use these more than two hours each day. He further stated that the financial condition of the company at the present time was such as to prevent the installation of duplicate machinery.

Mr. Hill then presented the report of the engineering committee and the matters were taken up for consideration as follows:

The question of the proposed reconstruction and enlargement of the sewage treatment works at Shelby was considered.

Mr. A. Elliott Kimberly, consulting engineer for Shelby, being present was asked to explain certain features of the design of the proposed improvement and to inform the Board in regard to the characteristics of the sewage to be treated that make it possible to secure sufficient purification by the plant as designed. These explanations were given to the satisfaction of the Board.

It was then moved by Dr. Grube and seconded by Dr. Warner to approve the plans for proposed reconstruction and enlargement of the sewage treatment works at Shelby, submitted by Mr. A. Elliott Kimberly, consulting engineer for the village, February 1, 1913, subject to the following conditions:

1st. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

2nd. That the village appoint a competent operator for the works;

3rd. That additional tank and filter capacity be added by the village within two years after the completion of the improvements, unless the results of operation of the plant shall demonstrate to the satisfaction of the State Board of Health that such additions are unnecessary; and,

4th. That this approval shall be void unless the proposed reconstruction and enlargement of the sewage treatment works shall have been made prior to November 13, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Board then took up the complaint of the council of the city of Toledo, as set forth in a resolution adopted September 6, 1910, that the city of Toledo was polluting Swan Creek with sewage and other wastes; and the complaint of the trustees of Washington Township, Lucas County, Ohio, received December 31, 1910, that the city of Toledo was polluting Ten Mile Creek with sewage and other wastes; and the report of the Board's committee, Dr. Hasencamp and the chief engineer, appointed to investigate these complaints, was considered.

It was moved by Dr. Grube, and seconded by Dr. Warner, that the Board finds from the report of its committee, and other evidence that

1. Swan Creek is seriously polluted by sewage and industrial wastes discharged into the stream within the city of Toledo and that

conditions are thereby created which are detrimental to the health and comfort of persons residing or passing in the vicinity of this stream; and,

2. Ten Mile Creek is seriously polluted by sewage and industrial wastes discharged into the stream within the city of Toledo, and that conditions are thereby created which are detrimental to the health and comfort of persons residing or passing in the vicinity of this stream.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller, Warner and Hill. Nays, none.

Thereupon it was moved by Dr. Grube, and seconded by Dr. Warner that the Secretary of the Board be instructed to notify the city of Toledo of the Board's findings and that the Board has fixed 3 P. M., Thursday, the twentieth day of March 1913, at the Secor Hotel, Toledo, as the time and place, when and where, the city of Toledo, by its officers, or others, may have an opportunity to be heard and to show cause, if any, why the conditions as set forth in the report of the committee should not be improved by the construction of intercepting sewers and sewage treatment works, prior to January 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller, Warner and Hill. Nays, none.

The plans for Marysville were then considered, and it was moved by Dr. Grube, and seconded by Dr. Warner, to approve the plans for proposed sewerage and sewage treatment plant, submitted by Mr. R. Winthrop Pratt, consulting engineer for the village, February 13, 1913, subject to the following conditions:

1st. That the proposed sewage treatment plant be constructed before any connections to the sanitary sewers are permitted;

2nd. That the village council enact an ordinance satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers, providing a proper official to supervise the maintenance of the sewers and sewage treatment works and providing that within two months after the completion of the sanitary sewers and sewage treatment works, all existing sewer connections in violation of the ordinance be removed;

3rd. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

4th. That plans for automatic apparatus to control the operation of the contact and intermittent filters be submitted to the State Board of Health;

5th. That the sewage treatment works be enlarged, or otherwise modified, when required by the State Board of Health; and

6th. That this approval shall be void unless the proposed sewers and sewage treatment works shall have been installed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary was instructed to advise the consulting engineer that in the opinion of the Board,

1st. The design should be revised by providing for automatic sequence of operation of the intermittent fine grain filters, and

2nd. Valves or plugs in the sludge riser pipes should be added to provide control in the removal of sludge.

It was moved by Dr. Warner and seconded by Dr. Grube to approve the plans and specifications for a proposed sewage treatment plant at Lakeside, prepared by Mr. R. Winthrop Pratt, consulting engineer, and received from Mr. A. B. Jones, superintendent of The Lakeside Campmeeting Association, February 13, 1913, subject to the following conditions:

1st. That a competent operator be placed in charge of the plant;

2nd. That the sludge be removed from the tank only after the close of the summer season after the operation of the water purification plant has terminated;

3rd. That the plant be altered, repaired, or enlarged whenever alterations, repairs, or enlargements are deemed necessary by the State Board of Health; and,

4th. That this approval shall be void unless the plant shall have been installed prior to June 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

After consideration of the report of the chief engineer upon the water purification plant at Conneaut, it was moved by Dr. Warner and seconded by Dr. Grube that the Board require The Conneaut Water Company to immediately submit revised plans for the enlargement of the water purification plant made during the early part of 1912, which plans shall incorporate loss of head gages, rate controllers, and measuring devices for the filters; and in the event of the failure of the company to submit such revised plans prior to April 15, 1913, to refer the matter to the Attorney General for legal action against the said company.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary was instructed to notify The Conneaut Water Company that the foregoing named accessories are necessary to secure uniformity in the operation of the filters, and that even with the recent enlargement the clear well capacity represents only a small period of storage, which, with increasing pumpage, will be inadequate to make a regular rate of operation of the filters possible.

The Board then took up the complaint of the trustees of Emerald Township, Paulding County, Ohio, that the German American Sugar

Company of Paulding, Ohio, was polluting Flat Rock Creek by the wastes from its plant; and the report of the chief engineer upon an investigation of this complaint was considered.

It was moved by Dr. Warner and seconded by Dr. Grube that the Board finds, from the report of its chief engineer of an investigation made December 11, 1912, that the wastes discharged into Flat Rock Creek from the plant of the German American Sugar Company at Paulding have so contaminated the stream as to give rise to foul and noxious odors, thereby creating conditions detrimental to the health and comfort of the citizens residing near said stream.

The roll call upon the adoption of this motion resulted as follows. Yeas, Messrs. Hasencamp, Grube, Miller Warner and Hill. Nays, none

Thereupon it was moved by Dr. Warner and seconded by Dr. Grube that the Secretary of the Board be instructed to notify the German American Sugar Company at Paulding of the Board's findings and to state that the Board has fixed 3 P. M. Thursday, the twentieth day of March 1913, at the Secor Hotel, Toledo, as the time and place, when and where, representatives of The German American Sugar Company may have an opportunity to be heard and to show cause, if any, why a plant to treat the wastes to such an extent as to abate the existing nuisance should not be installed prior to October 1, 1914.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller, Warner and Hill. Nays, none.

The Board then took up the complaint made by the council of Rocky River that the sewage from the reduction plant of the city of Lakewood was contaminating the Rocky River; and the report of the Board's committee, Dr. Miller and the chief engineer, appointed to investigate this complaint was considered.

It was moved by Dr. Grube and seconded by Dr. Warner that the Board finds from the report of its committee that the sewage treatment plant at Lakewood was not, upon examination February 13, 1913, giving rise to foul and noxious odors and that its effluent was not visibly polluting the Rocky River.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller, Warner and Hill. Nays, none.

It was then moved by Dr. Grube and seconded by Dr. Warner that the Secretary be instructed to advise the officials of Lakewood and Rocky River as follows:

1st. The sewage treatment works of Lakewood are seriously overworked and cannot be expected to permanently treat to a satisfactory degree the large volume of sewage received.

2nd. Immediate steps should be taken by the city of Lakewood to improve conditions attending the disposal of sewage, and an expert should be employed to devise plans either for enlarging the existing installation or for installing an entire new plant with an effluent discharge into Lake Erie.

3rd. The water supply intake of Rocky River is unsuitably located and the water purification plant does not produce a satisfactorily purified water at all times; and the intake and plant were installed without the approval of the State Board of Health.

4th. The intake should be extended to Lake Erie and raw water obtained at a point where only a mildly polluted water can be secured.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller, Warner and Hill. Nays, none.

The Board then took up for consideration the report of the chief engineer upon investigations of the pollution of Wills Creek by sewage from the city of Cambridge, made in response to a complaint from the trustees of Cambridge Township, Guernsey County, that the city of Cambridge was grossly polluting Wills Creek by the discharge of sewage into the creek.

It was moved by Dr. Grube and seconded by Dr. Warner that the Board finds from the report of its chief engineer that Wills Creek at and below the city of Cambridge is grossly polluted by sewage and other wastes discharged into the stream at Cambridge, which give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of persons residing in the vicinity of the stream.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller, Warner and Hill. Nays, none.

Thereupon it was moved by Dr. Grube and seconded by Dr. Warner that the Secretary of the Board be instructed to notify the authorities of Cambridge of the Board's findings and to state that the Board has fixed 3 P. M. Thursday, the twentieth day of March 1913, at the Secor Hotel, Toledo, as the time and place, when and where the city of Cambridge, by its officers or others, may have an opportunity to be heard and to show cause, if any, why the city should not be required to install sewage treatment works prior to June 1, 1914.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller, Warner and Hill. Nays, none.

The Secretary was also instructed to advise the officials of Cambridge that should a petition under Section 1252 of the General Code, requesting investigation of the water supply, be submitted by the city board of health prior to or at the time of said hearing, the Board would extend the time for the installation of sewage treatment works to permit of the immediate installation of a water purification plant.

The Board then took up the question of the site proposed for sewage treatment works and sewerage for Bedford, as shown on plans prepared by Messrs. E. J. Watson and C. W. Courtney, engineers for the village, and submitted by Mr. L. R. Landfear, village solicitor, January 20, 1913.

It was moved by Dr. Warner and seconded by Dr. Grube to approve the site for sewage treatment works subject to the condition that this site be utilized for the construction of sewage treatment works prior to January 1, 1915; and to withhold approval of the plans for a system of combined sewers for the village of Bedford, and to instruct the Secretary to advise the consulting engineers and the village officials that a comprehensive system of sanitary sewers and sewage treatment works should be designed for reasons previously outlined by the Board, namely:

1st. Owing to the local topography a complete system of sewers for the removal of storm water is not required; and

2nd. The treatment of the dry weather flow of sewage is necessary and with the use of combined sewers a plant provided for this purpose will be seriously damaged by excessive flow reaching it during and following storms.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Warner to approve the revised plans for proposed sewerage and sewage treatment plant for Sewer District No. 1, Franklin County, submitted by Messrs. Burgess and Long, consulting engineers, February 17, 1913, subject to the following conditions:

1st. That the sewage treatment plant be constructed before any connections to the sewers are permitted;

2nd. That a competent official be provided by the county commissioners to supervise the sewer system and operation of the sewage treatment plant;

3rd. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

4th. That details of the automatic apparatus for the control of the contact filters be submitted to the State Board of Health;

5th. That the area of the sludge filters be increased to at least 800 square feet; and

6th. That this approval shall be void unless the proposed sewers and treatment plant shall have been constructed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary was instructed to advise the consulting engineers that a more complete displacement of flow, and therefore more efficient sedimentation will be accomplished with a direction of flow parallel to the circumference instead of across the tanks.

The Secretary read a report of a conference held February 3, between representatives of the city of Bucyrus, the chief engineer and himself, relative to carrying out improvement in the disposal of the sewage of that city which has caused the pollution of the Sandusky River; this conference having been ordered at the January 1913 meeting. The report stated that the city is now contemplating the purchase of the public water supply furnished by The Bucyrus Development Company, and that an issuance of bonds for sewerage improvements might defeat the water works issue; and that the Secretary had advised the representatives that prior to March 1, 1913, copies of an action of the city council providing for the preparation and submission of plans for the required sewerage improvements should be filed with the State Board of Health, and they had expressed their intention of carrying out these instructions. As the Board's approval of the plans, given March 2, 1911, expired January 1, 1913, they were also advised that it would be necessary to again submit the plans, or submit revised plans.

On motion of Dr. Grube, seconded by Dr. Warner, the report was adopted.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary read a report of a conference between representatives of the city of Bellaire and the chief engineer and himself, held February 3, relative to carrying out the order of the Board for the improvement of the public water supply. The conference was ordered at the January meeting of the Board. It was stated that council had passed an ordinance appropriating $4,500. to carry out repairs recommended by the consulting engineer and the city engineer and that it would be impossible to complete such repairs prior to March 1, 1913, and that it would probably be June 1st before the completion of the repairs. It was further stated that the Secretary had advised the representatives that the Board would not be disposed to force unreasonable demands upon the city and would await the results of the present effort to repair the water purification plant before taking further action to compel the city of Bellaire to provide a satisfactory water supply, it being understood that the repairs would be made as rapidly as possible and the Board informed of their progress.

Dr. Grube moved, and it was seconded by Dr. Warner, that the report be approved and that the city officials of Bellaire be notified that if the repairs proposed are not successful, immediate measures must be taken to provide a satisfactory water supply and plans for the same be presented to the Board at its June meeting or soon thereafter.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

Mr. Hill then read a report and made a statement relative to the work of the committee appointed at the January meeting to consider the matter of pollution of international boundary waters.

At the request of Mr. Hill. the committee was given further time.

The Secretary informed the Board that a request had been received from council of the village of New London, asking if the village could proceed in the development of a water supply in accordance with plans presented in 1904.

Mr. Hill moved that the approval of plans for the development of a public water supply for the village of New London be rescinded, and that the council be notified that it will be necessary to present a new set of plans for consideration by the Board.

This motion was seconded by Dr. Grube.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary presented a list of persons who had been appointed by their respective councils to serve as health officers in lieu of a board of health.

On motion of Mr. Hill, seconded by Dr. Grube these health officers were approved.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary presented the request of the Catharine Booth Home for Girls, for a renewal of their license to conduct a maternity boarding house and lying-in hospital at 912-918 Windsor Avenue, Cincinnati; providing for the care of twelve women and twenty-five children.

It was moved by Mr. Hill and seconded by Dr. Grube to grant a renewal of this license.

Those voting in the affirmative were Messers. Hasencamp. Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary presented the matter of the revocation of the license of Lida M. Bowers of Toledo. to conduct a maternity boarding house and lying-in hospital.

On motion of Mr. Hill. seconded by Dr. Warner, the matter was referred to the president, Dr. Hasencamp. to report at the March meeting.

Those voting in the affirmative were Messrs. Hasencamp. Grube, Miller. Warner and Hill.

In the negative. none.

Dr. Warner. as a special committee on the location of sewage treatment works for the village of Bexley. reported progress and asked for further time.

An extension of time was granted.

The Secretary presented the following resolution and made a statement relative to the order of the Board (2-18-1911) requiring the installation of water purification works at Ironton:

> *Be it resolved by the Ohio State Board of Health,* That the city of Ironton, Lawrence County, Ohio, be and is hereby ordered to install and have in operation a water filtration plant, of a design satisfactory to the State Board of Health, on or before eighteen months after this order is approved by the Governor and Attorney General; that the Secretary of the State Board of Health be instructed to transmit a copy of this order with the proceedings thereon to the Governor and Attorney General for approval and when such order is approved that he transmit a copy of the order and proceedings thereon to the mayor and council of the city of Ironton.

On motion of Mr. Hill, seconded by Dr. Miller, this resolution was adopted.

The roll call upon the adoption of the motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller, Warner and Hill. Nays, none.

The Secretary presented a complaint made by the health officer of the village of Caldwell, Noble County, relative to the condition of the public water supply of that village.

On motion of Dr. Grube, seconded by Dr. Miller, the matter was referred to the chief engineer for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary presented the resignation of R. F. MacDowell as assistant engineer, and on motion of Mr. Hill, seconded by Dr. Grube, this resignation was accepted with regret.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary recommended a readjustment of salaries in the engineering department, as follows:-

Salary of M. Z. Bair, principal assistant engineer, increased from $1400 to $1500 per year. To be in effect February 15, 1913.

Salary of L. H. Van Buskirk, assistant engineer, increased from $1200 to $1400 per year. To be in effect February 15, 1913.

The Secretary also reported that efforts were being made to obtain suitable persons for the vacancies that now exist in the engineering department.

On motion of Dr. Warner, seconded by Dr. Grube, the above recommendations and report were approved.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary recommended that the order relating to the common drinking cup and the common towel, adopted at the January meeting, be amended so as to prohibit the use of the common drinking cup and common towel in any workshop or factory.

It was moved by Dr. Miller and seconded by Dr. Warner to so amend the order. Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary called attention to the meeting of the committees of the American Medical Association on public health, medical legislation and medical education, to be held in Chicago, February 24th and 25th.

On motion of Mr. Hill, seconded by Dr. Miller, the president and secretary were appointed delegates to this meeting.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

Mr. L. R. Landfear, village solicitor, and Mr. C. W. Courtney, consulting engineer for the village of Bedford, appeared before the Board in reference to sewerage for that village. After being notified that the Board had withheld approval of the plans for combined sewers, they asked that the matter be reconsidered.

It was then moved by Dr. Grube and seconded by Mr. Hill to reconsider the vote on sewerage for Bedford.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

It was moved by Mr. Hill, and seconded by Dr. Grube, to approve the site selected for sewage treatment works for the village of Bedford, and to refer the plans for combined sewers to the engineering committee and the chief engineer for further investigation.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

It was moved by Dr. Grube and seconded by Mr. Hill to meet in Toledo, March 20th, at the Secor Hotel; a public meeting for hearing of delegates to be at 3 P. M., and the regular meeting at 8 P. M.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

On motion of Mr. Hill, seconded by Dr. Grube, the Board adjourned.

Attest: E. F. McCampbell,
Secretary.

Approved March 20, 1913.

MARCH MEETING

1913

Pursuant to adjournment the State Board of Health met at 3 P. M., March 20, 1913, in the Hotel Secor, Toledo, Ohio, to hear representatives of the cities of Toledo and Cambridge, and of the German American Sugar Company of Paulding; citations for such hearings having been issued as provided in the Bense Act.

There were present Drs. Hasencamp, Grube and Miller and Mr. Hill.

Mr. S. C. Carnes, city solicitor, appeared for the city of Cambridge.

The Secretary read the complaint and a letter under date of February 26, 1913, to the mayor and council of Cambridge, citing the officials of that city to appear at this meeting to show cause, if any, why the city should not be required to install sewage treatment works prior to June 1, 1914.

Mr. Carnes stated that the city officials realized the necessity of doing something to relieve the conditions created by discharging sewage and other wastes into Wills Creek but that there was a greater necessity for a good public water supply, and he then submitted to the Board a petition from the board of health declaring the public water supply to be unsafe and asking the State Board of Health to investigate the same and to take action to require the city to install a new supply or to purify the present supply. He further requested that the State Board take no further action in the matter of sewage pollution of Wills Creek until the water supply had been investigated.

The matter was referred to executive session.

The Board then took up for consideration the matter of the pollution of Ten Mile Creek by sewage and wastes from the city of Toledo, and the Secretary read the complaint and a letter under date of February 26, 1913, citing the mayor and council and director of public service to appear before the Board to show cause, if any, why the city should not be required to improve the conditions complained of by the construction of intercepting sewers and sewage treatment works prior to January 1, 1914.

There appeared for the city Messrs. J. R. Cowell, director of public service, G. C. Tonson, city engineer, J. C. Staunton, A. T. Goorley and ——— McDunn, councilmen, W. J. Sherman consulting engineer, and numerous citizens.

The matter was fully discussed by the city officials and others with the members of the Board, and Mr. Sherman explained in some length the studies made by him to relieve the conditions complained of, using for illustration a large map showing the drainage area of Ten Mile and Swan creeks in the vicinity of Toledo, and referring to a report submitted to council in November, 1911. Everyone who spoke in reference to the matter admitted that some action should be taken but it was claimed by some that adequate relief for the present would be given by the construction of intercepting sewers, avoiding the installation at this time of sewage treatment works. The time for submitting plans was argued by Mr. Hill and the city officials.

By motion the matter was referred to executive session.

The Board then took up for consideration the matter of pollution of Swan Creek and the Secretary read the complaint and a letter under date of February 26, 1913, citing the officials of the city to appear before the Board to show cause why the city should not construct intercepting sewers and sewage treatment works prior to January 1, 1915, in order to improve the conditions complained of. The officials who appeared with reference to Ten Mile Creek also appeared to represent the city with reference to this complaint. Each city official was heard and in no case was the statement made that Swan Creek was not a public nuisance. Mr. Staunton claimed that the addition of water from the Miami and Erie Canal materially benefited the stream but it was pointed out that the point of inlet was but a short distance above the outlet of the creek and that the upper part of the creek was not benefited.

Mr. Sherman explained in detail the different feasible plans proposed by him to remedy conditions in Swan Creek and the time for submission of plans was argued.

On motion the matter was referred to executive session.

The Secretary presented a communication from the German American Sugar Company requesting that their hearing be postponed to the April meeting of the Board.

On motion by Mr. Hill, seconded by Dr. Grube, the request was granted.

The Board then recessed to meet at 8 P. M.

SECOND SESSION.

8 P. M.

Present Messrs. Hasencamp, Grube, Hill and Miller.

Mr. Louis Hilb, mayor of Oak Harbor, requested the Board to change a condition of the approval of a sewer system for that village (3-22-1912) so that the village could proceed with the construction of a trunk sewer before submitting detailed plans of the sewer system, claiming that the village was financially unable at this time to construct the trunk sewer and also have plans prepared.

The chief engineer explained to the Board and Mr. Hilb the conditions of the approval and the necessity of having full detailed plans before sewer construction is commenced.

It was suggested by Mr. Hill that by cutting down the length of the sewer proposed for present construction, enough could be saved to pay for the plans required by the Board.

Referred to executive session.

Mr. John A. Smith, mayor of the village of Maumee appeared with reference to plans for sewers for that village and agreed to the conditions of approval as outlined in the later action of the Board.

Mr. R. Winthrop Pratt, consulting engineer, was present and stated that a petition would be presented from the board of health of Painesville asking for an investigation of the public water supply under the Bense Act, and requested that a committee be appointed to investigate this complaint when received.

The Board then went into executive session.

On motion of Mr. Hill, seconded by Dr. Grube, the minutes of the February meeting were approved.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill and Miller.

In the negative, none.

It was moved by Mr. Hill, and seconded by Dr. Grube, to approve the financial report, this being a statement of the expenditures from February 16, 1913, to and including March 15, 1913, and balances available on March 16, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

It was moved by Dr. Grube, and seconded by Mr. Hill, to approve the monthly report of the Secretary.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill and Miller.

In the negative, none.

The Secretary presented the following recommendations:

1st. That the salary of the assistant secretary, James E. Bauman, be increased to $3,000 per annum, dating from February 15, 1913.

2nd. That Harold E. Babbitt be appointed an assistant engineer, at a salary of $1,200 per annum.

3rd. That Margaret Richter be given a regular position as stenographer, and that her salary be increased to $600 per annum dating from February 15, 1913.

4th. That Leo F. Ey be given the position of a laboratory assistant, his salary to remain $840 per annum.

5th. That C. K. Weiman, laboratory helper, be given a salary of $600 per annum, dating from February 15, 1913.

6th. That Elmer Boehm, laboratory helper, be given a salary of $480 per annum, dating from February 15, 1913.

7th. That Ralph Alvord be given the title of laboratory helper, and that his salary be increased to $480 per annum, dating from February 15, 1913.

8th. That Marie W. Game be made a general clerk and that her salary be increased to $720 per annum, dating from February 15, 1913.

It was moved by Dr. Miller and seconded by Mr. Hill to approve the above recommendations.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

At the request of the Secretary, Mr. Dittoe made a statement in regard to an investigation as to the qualifications of Harold E. Babbitt for the position of assistant engineer. This statement was supplemented by Dr. Hasencamp and the Secretary, who had interviewed Mr. Babbitt.

On motion of Mr. Hill, seconded by Dr. Grube, Mr. Babbitt was appointed as assistant engineer, at a salary of $1,200 per annum.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

The Secretary made a statement relative to a proposed organization for the survey of occupational diseases.

Mr. Hill presented his report as engineering committee, and the matters were taken up in the following order:

It was moved by Dr. Miller, and seconded by Dr. Grube to approve the plans for the development of the proposed water supply for Glouster, submitted by Mr. A. Elliott Kimberly, consulting engineer, on March 10, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller, Warner and Hill.

In the negative, none.

The Secretary was instructed to advise the village and its consulting engineer that in plugging or capping the well tops, installing the gravity conduit, and constructing the pump well especial care must be taken to secure watertightness to avoid the danger of pollution of the supply especially during high stages of Sunday Creek.

He was also instructed to inform them that the availability of a water supply of adequate quantity and satisfactory mineral quality is not assured inasmuch as no exhaustive tests of the quantity of the supply have been made, in accordance with the first condition of the Board's approval of a proposed water supply for Glouster, granted October 23, 1912.

It was moved by Dr. Grube, and seconded by Dr. Miller to grant the request received from William H. Gould, February 24, 1913, asking the

Board to extend the time set for the submission of plans for the main sewer and sewage treatment works in Main Sewer District No. 2, Lucas County, and to revise the first condition of the Board's approval of a proposed Local Sanitary Sewer No. 1, Main Sewer District No. 2, in Gradolph Avenue, West Toledo, given December 12, 1912, to read as follows:

> "1st. That the Board of County Commissioners of Lucas County have prepared and submitted to the State Board of Health prior to January 1, 1914, plans and specifications for a main sewer or sewers and sewage treatment works in Main Sewer District No. 2. Lucas County, the necessity for which was declared in a resolution adopted by the State Board of Health August 15, 1912."

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

It was moved by Dr. Miller, and seconded by Dr. Grube to adopt the following resolution relative to the purification of the water supply of Woodsfield:

> WHEREAS, The State Board of Health at a meeting held September 12, 1912, considered a report upon the public water supply of Woodsfield and found that this supply is unsuitable for use; and,
>
> WHEREAS, The State Board of Health at a meeting held October 23, 1912, voted to require The Woodsfield Water Company to submit plans for the purification of the water supply of Woodsfield prior to the January, 1913, meeting of the Board; and,
>
> WHEREAS, At a meeting of the State Board of Health held January 22, 1913, plans for a proposed water purification plant for Woodsfield submitted January 18, 1913, were conditionally approved; therefore,
>
> *Be it resolved,* That the State Board of Health declare the necessity for the installation of a water purification plant at Woodsfield prior to January 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

The Secretary was instructed to send a copy of the above resolution to The Woodsfield Water Company and to the mayor and council of Woodsfield.

The Board took up the report of the health officer of Caldwell that the water supply of that village was believed to be impure and dangerous to the health of the consumers, and the report of the chief engineer, upon his investigation of this complaint, was considered.

It was moved by Dr. Grube, and seconded by Dr. Miller that the Board finds, from the report of its chief engineer of an investigation made March 10th and 11th, 1913, that the public water supply of Caldwell is impure and dangerous to the health of the consumers of the supply.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller and Hill. Nays, none.

Thereupon, it was moved by Dr. Grube, and seconded by Dr. Miller that the Secretary of the Board be instructed to notify the authorities of Caldwell of the Board's findings and to state that the Board has fixed 8 P. M., Thursday, the seventeenth day of April 1913, at the office of the Secretary, Hartman Building, Columbus, as the time and place, when and where the village of Caldwell, by its officers or others, may have an opportunity to be heard and to show cause, if any, why the village should not be required to install a water supply of satisfactory quality prior to November 1, 1914.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller and Hill. Nays, none.

It was moved by Dr. Miller, and seconded by Dr. Grube to approve the plans and specifications for proposed sewerage and sewage treatment works for East Palestine, submitted by Mr. L. E. Chapin, consulting engineer, February 13, 1913, subject to the following conditions:

1st. That the proposed sewage treatment works be constructed before any connections to the sanitary sewers are permitted;

2nd. That the village council enact an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers, and providing for a proper official to supervise the maintenance of the sewers and treatment works and that within two months after the completion of the sanitary sewers and sewage treatment works, all existing connections in violation of the said ordinance be abandoned and removed;

3rd. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

4th. That details of automatic apparatus to control the operation of the contact filters be submitted to the State Board of Health;

5th. That the sewage treatment works be enlarged or otherwise modified when required by the State Board of Health; and

6th. That this approval shall be void unless the proposed sewers and sewage treatment works shall have been installed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

The Secretary was instructed to advise the officials of East Palestine that efficient operation of the proposed sewage treatment works must be secured at all times to prevent the pollution of Leslie Run; and to make efficient operation possible it is necessary that constant inspection of construction of the works by a competent engineer be provided, and that regular attention be given to the operation of the various devices.

He was also instructed to advise the consulting engineer as follows:

1st. To provide for equal sludge deposition the design of the settling tanks should make possible reversal of flow through the tanks when operated in series;

2nd. Increased head for sludge removal should be utilized; and,

3rd. The ventilators provided for the contact filters should be omitted.

It was moved by Dr. Miller, and seconded by Dr. Grube to approve the plans and profiles for proposed sanitary sewers for Sewer District No. 4, Canal Dover, submitted by Mr. George E. Arnold, city engineer, on January 21st and February 20, 1913, subject to the following conditions:

1st. That the village council by ordinance provide for the abandonment, disinfection and filling of all cesspools and privy vaults within 1,000 feet of any public supply wells, and for the installation of direct house connections to the sewers within three months after the completion of the proposed sewers, and that a certified copy of said ordinance be submitted to the Secretary of the State Board of Health;

2nd. That all proposed sewers within 1000 feet of any of the public supply wells be made water tight either by the use of cast iron pipe or by sealing the joints of the sewers with an asphaltic compound;

3rd. That detailed plans of the pumping equipment for lifting the sewage from the proposed system to the existing sewer be submitted to the State Board of Health before contracts for its installation are awarded; and,

4th. That contracts for sewage treatment works, general plans for which were approved by the Board January 22, 1913, be awarded prior to July 1, 1913; and,

5th. That this approval shall be void after July 1, 1913, unless all the foregoing conditions shall have been complied with prior to that date.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

It was moved by Dr. Miller, and seconded by Dr. Grube to approve the site proposed for sewage treatment works for Bexley, as shown on the plan submitted by Mr. A. Elliott Kimberly consulting engineer, on January 15, 1913, subject to the condition that plans for the proposed sewage treatment works be submitted to the State Board of Health prior to September 1, 1913, and the works be installed prior to October 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

It was moved by Dr. Grube, and seconded by Dr. Miller to withhold approval of the plans for a proposed water purification plant for Rossford; received from Mr. C. L. Lewis, secretary of The Edward Ford

Plate Glass Company on March 4, 1913, and the Secretary was instructed to advise the Company and the health officer of Rossford as follows:

The respective problems associated with treatment of water for industrial use and treatment of water to improve its sanitary quality are not identical and the solutions are not arrived at in exactly the same manner. A plant for the treatment of a public water supply to prevent disease must be of somewhat different design and must be operated with more particular attention to certain features than is the case with an industrial softening plant. Therefore, it is advisable that a plant for the purification of the water supply of Rossford should be designed with the purpose of producing the highest possible efficiency from a sanitary standpoint, and such a plant should preferably be built and operated entirely independently of an industrial softening plant.

It is the opinion of the Board that the plans received March 4, 1913, do not provide sufficient settling, filtering and clear well capacity, and that a satisfactorily purified effluent at all times is not assured. Revised general and detailed plans should be prepared and submitted to the State Board of Health.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

It was moved by Dr. Miller, and seconded by Dr. Grube to approve the plans for proposed additional sewerage for Newburgh Heights, submitted by Mr. Ralph Hecker, engineer for the village, February 5th and 14th, 1913, subject to the following conditions:

1st. That the proposed sewers shall be utilized only for the removal of storm water and shall not be used to receive sewage or other offensive wastes until one of the following condition shall have been met:

a. Connection of the proposed sewers to the contemplated intercepting sewer of the city of Cleveland.

b. Contract with the city of Cleveland for connection with the intercepting sewer when completed, and the construction of temporary sewage treatment works following the signing of such a contract; such works to be abandoned immediately after connection with the Cleveland intercepting sewer has been made.

c. Construction of permanent sewage treatment works in event of failure of the city of Cleveland to construct the contemplated intercepting sewer or in event of failure of the village to effect a contract with the city for connection to the intercepting sewer.

2nd. That the village council pass an ordinance satisfactory to the Secretary of the State Board of Health prohibiting the use of the proposed sewers for sanitary purposes, until such use has been approved by the State Board of Health following the carrying out of one of the three conditions above mentioned.

Those voting in the affirmative were Messrs. Hasencamp. Grube. Miller and Hill.

In the negative, none.

It was moved by Dr. Miller, and seconded by Dr. Grube to approve the plans for a proposed storm sewer for Maumee, submitted February 19. 1913, by Mr. George Champe, consulting engineer for the village, subject to the following conditions:

1st. That before contracts for the installation of the sewer are awarded, the village council by ordinance shall provide:

a. That no connections for sanitary purposes to the proposed sewer or future laterals be permitted.

b. That no future laterals having connections for sanitary purposes be connected with the proposed sewer.

2nd. That this approval shall be void unless the proposed sewer shall have been constructed prior to January 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp. Grube, Miller and Hill.

In the negative, none.

The Secretary was instructed to advise that council submit a draft of the proposed ordinance, incorporating the points mentioned, to the Secretary of the State Board of Health for approval prior to its passage.

It was moved by Dr. Grube and seconded by Dr. Miller to approve for temporary use, a proposed additional water supply for Westerville, to be obtained from one or more drilled wells 440 feet deep (approximately) located at the site of the existing public supply wells, subject to the conditions that the approval shall become void January 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

The Secretary was instructed to inform the mayor and council that the location of the existing and proposed additional public water supply wells is unsatisfactory, due to the proximity of sources of pollution, and that the encroachment of habitations near the wells, resulting from the development of the village is rapidly increasing the danger of pollution of the supply; also that the quality of the proposed additional supply is very objectionable due to its mineral constitutents.

He was further instructed to advise the mayor and council that immediate steps should be taken to locate a source of ground water supply of satisfactory quality and adequate quantity at a point removed from the built up portion of the village and a new supply should be installed and ready for use prior to January 1, 1915. the date at which the temporary approval of the proposed addional supply shall expire.

It was moved by Dr. Miller, and seconded by Dr. Grube to approve the general plans for proposed sewage for the Madisonville District, Cincinnati, received from Mr. V. T. Price, director of public service, February 21, 1913, subject to the following conditions:

1st. That before contracts for the proposed sewers are awarded detailed plans, satisfactory to the Engineer of the State Board of Health, shall be submitted showing sizes, grades, and location of the sewers; design of manholes, inlets, storm water overflows, and interceptor connections; and other features of the system;

2nd. That the city shall maintain regular inspection of all storm water overflows and interceptor connections to prevent and correct stoppage of the intercepting sewers;

3rd. That any of the proposed storm water overflows shall be extended to a suitable point of discharge when deemed necessary by the State Board of Health;

4th. That before the proposed sewers are used for sanitary purposes an intercepting sewer in the valley of Duck Creek, and proper disposal of the sewage shall be provided; and,

5th. That this approval shall be void unless plans to comply with the foregoing first and fourth conditions shall have been submitted prior to October 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

It was moved by Dr. Grube, and seconded by Dr. Miller to approve the general plan for proposed sewerage and sewage treatment works for Vermilion, submitted by Mr. L. E. Chapin, consulting engineer for the village, February 13, 1913, subject to the following conditions:

1st. That the sewage treatment works be constructed before connections to the sewers are permitted;

2nd. That the village council enact an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers; providing a proper official to supervise the maintenance of the sewers and sewage treatment works, and providing that within two months after the completion of the sanitary sewers and sewage treatment works, all existing sewer connections in violation of the ordinance be removed;

3rd. That before contracts for the installation of sewage treatment works are awarded, revised detailed plans be prepared and submitted to the State Board of Health for approval; and,

4th. That this approval shall be void unless the proposed sewers and sewage treatment works shall have been installed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

The Secretary was instructed to advise the consulting engineer that in the preparation of the detailed plans the following provisions should be made:

1st. Coverings for screen chamber and dosing channel;

2nd. Division of settling capacity into three units;

3rd. Improved facilities for sludge removal by increased floor slopes and proper location of drains; and,

4th. Increased area of filters to at least one acre.

Dr. Hasencamp, to whom was referred the matter of revoking the license of Mrs. Lydia M. Bowers to conduct a maternity boarding house and lying-in hospital, reported that he had taken the matter up with the health officer of Toledo and that the health officer would recommend to the local board of health that a renewal of the license be refused.

Mr. Hill, as chairman of the committee on pollution of international boundary waters presented a report of the conference held in Cleveland March 4, 1913, with representatives from cities in Ohio on Lake Erie. He stated that a request had been made of the finance committee of the House of Representatives for a small appropriation to carry on the investigation of the pollution of Lake Erie. The Secretary read the letter to Hon. John Cowan, chairman of the finance committee, and his reply which is to the effect that he believes such an appropriation is not advisable at this time.

Mr. Hill moved that the report of the committee be received and filed for publication in an early issue of the *Monthly Bulletin* and that the committee be continued.

The motion was seconded by Dr. Miller and carried.

It was moved by Mr. Hill and seconded by Dr. Grube that the Board require the city of Toledo to submit, prior to the May meeting of the State Board of Health, definite general plans for the abatement of the pollution of Ten Mile Creek.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller and Hill. Nays, none.

It was moved by Mr. Hill and seconded by Dr. Grube that the Board require the city of Toledo to submit, prior to the June meeting of the State Board of Health, definite general plans for the abatement of the nuisance in Swan Creek.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller and Hill. Nays, none.

Mr. Hill moved that the complaint against the water supply of Cambridge be referred to the chief engineer for investigation, and that further action in regard to the pollution of Wills Creek be postponed to the April meeting.

This motion was seconded by Dr. Miller.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller and Hill. Nays, none.

Mr. Hill moved that the complaint against the water supply of

Painesville be referred to the engineering department and Dr. Miller, for investigation and report. This motion was seconded by Dr. Grube.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Miller and Hill. Nays, none.

The Secretary presented a list of health officers appointed by their respective councils to serve in lieu of a board of health.

On motion of Dr. Grube, seconded by Mr. Hill, it was voted to approve these health officers.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

The Secretary presented the application of Mrs. Mary E. Thorp, for a renewal of her license to conduct a maternity boarding house and lying-in hospital on Jason Avenue, Columbus, with provision for caring for fourteen children.

It was moved by Dr. Miller and seconded by Dr. Grube that the Board renew this license.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

The Secretary presented the request of Mrs. Nora E. Foster for a renewal of her license to conduct a maternity boarding house and lying-in hospital at 43 Oakland Avenue, Columbus, with provision for two women and two children.

It was moved by Dr. Miller and seconded by Dr. Grube that the Board renew this license.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

The Secretary presented the rules and regulations adopted by Dr. D. T. Phillips, serving as health officer of Bethesda in lieu of a board of health.

It was moved by Dr. Miller and seconded by Dr. Grube to approve these rules.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

The Secretary presented a report by an inspector of the Cincinnati health department on an investigation of alleged nuisances at St. Bernard.

On motion of Dr. Miller, seconded by Dr. Grube, this report was referred to Mr. Hill.

On motion of Dr. Miller, seconded by Dr. Grube, the Secretary was authorized to purchase a letter file case for the office and was instructed to investigate the matter of furnishing Mr. Hill with a file case for engineering reports.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Grube to approve the plan and profile, submitted by Mr. George Champe, consulting engineer, March 3, 1913, for a proposed main sanitary sewer for Oak Harbor, to extend from the intersection of Erie and Portage streets to a submerged temporary outlet into the Portage River some 2750 feet east of the Locust Street bridge, subject to the following conditions:

1st. That a purification plant of a design satisfactory to the State Board of Health be installed when in the opinion of said Board such becomes necessary;

2nd. That detailed plans of the sewerage system, including manholes, flush tanks, grades, sizes, and method of ventilation of the sewers; and location and construction of the outlet, be submitted to and receive the approval of the State Board of Health;

3rd. That this approval be void unless contracts for construction of the proposed main sanitary sewer shall have been awarded prior to September 1, 1913, and detailed plans, to comply with the foregoing second condition of approval, shall have been submitted prior to January 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Grube to approve the general plans for proposed sewerage for Bedford, prepared by Messrs. W. J. Watson and C. W. Courtney, engineers for the village, and submitted by Mr. L. R. Landfear, village solicitor, January 20, 1913, subject to the following conditions:

1st. That plans for sewage treatment works shall be submitted to the State Board of Health and that such works shall be installed before the proposed sewer system is used for sanitary purposes;

2nd. That before contracts for the proposed sewers are awarded detailed plans, satisfactory to the engineer of the State Board of Health, shall be submitted showing sizes, grades, and location of sewers; design of manholes, inlets or catch basins, and storm water overflows and interceptor connections; and other features of the system;

3rd. That the village shall maintain regular inspection of the storm water overflows and interceptor connections to prevent and correct stoppage of the intercepting sewers;

4th. That storm water overflows shall be extended when deemed necessary by the State Board of Health; and,

5th. That this approval shall be void unless detailed plans complying with the first and second foregoing conditions shall have been submitted prior to September 1, 1913, and unless the sewers and treatment works shall have been installed prior to August 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

Dr. Hasencamp presented a letter from Dr. Brayton, of Carey, relative to drainage for that village.

On motion of Dr. Grube, seconded by Dr. Miller, the letter was referred to the Secretary for reply.

The Secretary presented a list of health officers appointed by their respective councils to serve in lieu of a board of health.

On motion of Dr. Grube, seconded by Mr. Hill, these health officers were approved.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Miller and Hill.

In the negative, none.

There being no further business the Board adjourned to meet in Columbus, April 17, 1913, at the office of the Secretary.

Attest: E. F. McCampbell,
Secretary.

Approved April 17, 1913.

APRIL MEETING
1913

The regular monthly meeting of the State Board of Health was held in the office of the Secretary, at Columbus, at 8 P. M., April 17, 1913. There were present Drs. Hasencamp, Grube, Sutton, Warner, and Mr. Hill.

The Board took up for consideration the complaint by the trustees of Emerald Township, Paulding County, that the German American Sugar Company, of Paulding, was polluting Flat Rock Creek with wastes from its plant and had thereby created conditions detrimental to the health and comfort of citizens residing near said stream. The Secretary read a letter under date of February 26, 1913, citing the officials of said company to appear and show cause why the Board should not order the construction of a plant to treat these wastes to such an extent as to abate the existing nuisance. There appeared for the company Mr. H. A. Vallez, general superintendent, and Mr. J. A. Scott, local manager. After hearing the findings of the Board these representatives were asked to present statements in regard to this matter. Both representatives agreed that the plant was producing wastes that were likely to create a nuisance and made a statement that the officials of the company were investigating methods for disposing of its wastes in such manner as to avoid an occurrence of the nuisance and also to make a profit to the company by the sale of by-products. Mr. Vallez spoke in regard to studies he had made on this subject in Europe and of certain experiments that had been conducted in this country.

After a full discussion of the matter, Mr. Hill moved that the company be instructed to proceed with the study of the conditions created in the operation of the plant and to conduct such experiments as are necessary to determine the best methods of procedure; and that the company report to the State Board of Health at no greater interval than sixty days the progress that is being made. This motion was seconded by Dr. Sutton.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Hill, Sutton and Warner. Nays, none.

The Board then took up for consideration the complaint by the health officer of the village of Caldwell that the public water supply of that village is believed to be impure and dangerous to the health of the consumers. The Secretary read a letter under date of March 22, 1913, citing the officials of the village to appear before the Board to show cause, if any, why the village should not be required to install a water supply of satisfactory quality prior to November 1, 1914.

There appeared for the village Mr. H. A. Smith, village solicitor, and Mr. F. D. Cones, member of council. The said representatives were informed in regard to the findings of the Board relative to the condition of the public water supply, and were asked to make a statement as to why the village should not improve the public water supply as suggested in the letter of citation. The village solicitor made a statement that the residents of the village realized that a new water supply was needed and that they were willing to put in the necessary improvements if the funds could be raised. He further made a statement in regard to the inability of the village to raise the necessary funds owing to the tax limitation.

Dr. Warner moved that the village solicitor furnish to the Secretary of the State Board of Health full information in regard to the taxable value of the village property, bonded indebtedness and other information relating to the financial standing of the village, and that upon receipt of this information the Attorney General be asked for an opinion as to how the village could raise the necessary funds for the installation of a water supply.

This motion was seconded by Mr. Hill.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Hill, Sutton and Warner. Nays, none.

The Board then went into executive session.

The Board then took up for consideration the report of the committee on the investigation of a petition by more than 10 per cent. of the electors of the city of Painesville, making complaint that the public water supply of that city is impure and dangerous to the health of the consumers of said supply. The Secretary presented an affidavit by the clerk of the board of elections of Lake County, containing a sworn statement that said petition represented more than 10 per cent. of the electors of the city of Painesville; also a certified copy of a resolution adopted by the council of the city of Painesville authorizing the city solicitor to waive issuance and service of notice of hearing in reference to findings of the Board; also a statement by the city solicitor under authority of the city council, admitting that the public water supply of said city is impure and dangerous to health and that it is not practicable sufficiently to improve the character of such supply by removing the source or sources of pollution affecting it and that it is necessary to install and place in operation water purification works.

Thereupon the Secretary was instructed to read the report of the investigating committee. It was moved by Dr. Warner and seconded by Dr. Grube that the report of the committee be adopted and that the board find from said report and other evidence that the public water supply of Painesville is impure and dangerous to health.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Hill, Sutton and Warner. Nays, none.

It was then moved by Mr. Hill and seconded by Dr. Grube that the Board order the city of Painesville to install water purification works, of a design satisfactory to the State Board of Health, and to have the same in operation before January 1, 1914; to instruct the Secretary to submit said order to the Governor and Attorney General for their approval, and upon approval to transmit a copy of the order to the mayor and council of said city.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Hill, Sutton and Warner. Nays, none.

Mr. Hill moved that the minutes of the March meeting be approved and that the proceedings as therein recorded be adopted as the action of the State Board of Health. The motion was seconded by Dr. Sutton.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Hill, Sutton and Warner. Nays, none.

It was moved by Mr. Hill and seconded by Dr. Warner to approve the financial report, this being a statement of the expenditures from March 16th to and including April 15, 1913, and balances available on April 16, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

On motion of Mr. Hill, seconded by Dr. Sutton, the Secretary's monthly report and the recommendations therein were approved.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

Mr. Hill submitted a report of his investigation of the complaint of nuisances at St. Bernard. He stated that at his request representatives of the various industries complained of and the Cincinnati health department had met at his office on March 26th, and that he had taken up with them the question of the existence of nuisances and had endeavored to learn what measures would be taken by them to provide means for the prevention of said nuisances. He further stated that at the beginning of the conference all the representatives present were inclined to hold that their concerns were not responsible for existing conditions but that bfore the conference was over all of these persons had become interested in the proposition and agreed to make every effort to prevent the continuance of the nuisances and thus to remove further cause for complaint. He asked that this matter be made a special order until the manufacturers have had an opportunity to make thorough inquiry into their operations, and that the committee be continued indefinitely with leave to report from time to time as developments warrant a report.

Dr. Grube moved that the report be received and that the committee be continued. The motion was seconded by Dr. Sutton.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

The Secretary presented a statement relating to occupational diseases and appropriations granted for the use of the Board in the study of such diseases; and recommended that Dr. Emery Hayhurst, of Chicago, be placed in charge of the work under the direction of the Secretary. On motion of Dr. Grube, seconded by Dr. Warner, it was voted to appoint Dr. Hayhurst as Chief of the Division of Occupational Diseases at a salary of $3,000 per annum.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

The Secretary recommended that he be authorized to employ such clerical and other assistance as may be needed in the operation of the Division of Occupational Diseases. On motion of Dr. Grube, seconded by Dr. Warner, the Secretary was instructed to carry out this recommendation.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

The Secretary presented the matter of organization of the Division of Tuberculosis. It was moved by Dr. Grube, and seconded by Mr. Hill, that Dr. Warner and the Secretary be appointed as a committee to report on the organization of the Division of Tuberculosis, said report to be presented at the next meeting of the Board.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

The Secretary presented a resolution adopted by the board of health of the city of East Liverpool, stating that the public water supply of that city is a menace and detrimental to public health, and asking the State Board of Health to investigate said water supply. It was moved by Mr. Hill to refer this complaint to the engineering department for investigation and report. The motion was seconded by Dr. Warner.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

The Secretary also presented a petition from the board of health of East Liverpool, asking that the State Board of Health investigate conditions caused by lack of sewerage in East End, a part of the city. It was moved by Mr. Hill, and seconded by Dr. Warner, to refer this matter to the engineering department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

The Secretary presented a resolution adopted by the council of the city of Painesville, asking the State Board of Health to investigate conditions created by the discharge of wastes into Grand River and Lake Erie by the Diamond Alkali Company; it being stated that these wastes are of such character as to create a public nuisance, detrimental to health and comfort of the citizens of the city and a source of pollution of the public water supply of the city of Painesville. It was moved by Mr. Hill, and seconded by Dr. Grube, to refer this matter to the engineering department for investigation and report.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Grube, Hill, Sutton and Warner. Nays, none.

The Secretary made a statement in regard to the investigations of flood conditions and stated that a complete report of these investigations would be published in an early issue of the *Monthly Bulletin.*

The Secretary presented a list of health officers who had been appointed by their respective councils to serve in lieu of a board of health.

It was moved by Dr. Warner, and seconded by Mr. Hill, that these health officers be approved.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

It was moved by Mr. Hill, and seconded by Dr. Warner, to hold the next meeting of the Board at the Havlin Hotel, Cincinnati, May 15, 1913, at 8 p. m.

Those voting in the affirmative were Messrs. Hasencamp, Grube, Hill, Sutton and Warner.

In the negative, none.

There being no further business the Board adjourned.

Attest: E. F. McCampbell,
Secretary.

Approved May 15, 1913.

MAY MEETING

1913

A regular meeting of the State Board of Health was held at 8 P. M., at the Havlin Hotel, Cincinnati, May 15, 1913.

There were present Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

A hearing was given to a delegation from Wapakoneta in reference to the improvement of sanitary conditions. The delegation consisted of Dr. W. S. Stuckey and Mr. Grant Crow, members of the sewer committee of council; Mr. George Hassenier, village clerk; Mr. J. H. Meyer, city engineer, and Mr. A. Elliott Kimberly of Columbus, consulting engineer.

The Secretary read a letter under date of May 12, 1913, in which it is stated that council is desirous of bettering sanitary conditions by the construction of an intercepting sewer and treatment works but that the financial condition of the city will not permit of all the work being done at once. In order to learn the attitude of the Board a hearing was requested.

Dr. Stuckey stated that the present council was favorable to the construction of an intercepting sewer with the installation of treatment works as soon as deemed necessary by the State Board of Health. He stated that the present plan was to construct a trunk sewer that would intercept some fifteen sewers now discharging into the Auglaize River and to carry the sewage to a point below a dam north of the city. Mr. Kimberly explained the matter from an engineering standpoint and stated that council wanted an expression from the Board so that plans for sewers and treatment works could be made. The matter was argued by the Board, the delegation and by the chief engineer.

It was moved by Dr. Warner and seconded by Dr. Grube that the matter be referred to executive session.

The Board then went into executive session.

It was moved by Mr. Hill and seconded by Dr. Sutton that the minutes of the April meeting be approved.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Sutton that the monthly report of the Secretary be approved.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented the following report of the special committee on the organization of the Division of Tuberculosis:

To the Honorable State Board of Health:

GENTLEMEN: — Your committee appointed to consider plans for the organization of the new Division of Tuberculosis under the jurisdiction of the State Board of Health, and to make recommendations as to the personnel of this new division, begs leave to report as follows:

Your committee, after first taking up the general plan of organization, took up for careful consideration the proposition of a suitable person to act as chief of this new division.

Careful consideration was given to several names suggested and your committee eventually came to the conclusion that the most suitable person was Dr. Robert G. Paterson, the present Executive Secretary of The Ohio Society for the Prevention of Tuberculosis. Dr. Paterson is also recommended to the Board by the Executive Committee of The Ohio Society for the Prevention of Tuberculosis. He is perhaps the most familiar of any person in the State with the general tuberculosis problems which present themselves for solution.

Your committee would, therefore, recommend that Dr. Paterson be appointed chief of the Division of Tuberculosis at a Salary of $3,000 per year, dated from May 15, 1913. The committee asks to be continued and will, at an early date, present recommendations for the minor positions in this newly created division.

Very respectfully submitted,

FRANK WARNER,
Member.
E. F. MCCAMPBELL,
Secretary.

It was moved by Dr. Grube, and seconded by Dr. Warner, to adopt the report and recommendations.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary then presented the following report:

"*To the Honorable State Board of Health:*

GENTLEMEN: — Your committee appointed to consider plans for the new Division of Tuberculosis under the jurisdiction of the State Board of Health, and to make recommendations as to the personnel of this new division, begs leave to make further report; having had the matter under consideration for some time and in order to facilitate the immediate organization of the Bureau recommends:

First. That Miss Margaret Kamerer of Cleveland be appointed Supervising Nurse, at a salary of $1,500 per annum.

Second. That Miss Louise Mark of Columbus be appointed Statistician at a salary of $1,500 per annum.

Third. That Mr. E. W. Kolthoff of Dayton be appointed State Organizer at a salary of $1,800 per annum.

Your committee further recommends that the Secretary be empowered to appoint the necessary clerical and stenographic force for the new Division of Tuberculosis. Very respectfully submitted,

FRANK WARNER,
Member,
E. F. MCCAMPBELL,
Secretary."

It was moved by Dr. Warner and seconded by Dr. Sutton that the report and recommendations be adopted.

Those voting in the affirmative were: Messrs. Hazencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented the following resolution relative to approval of plans for cesspools and institutional sewage disposal plants and recommended its adoption.

"*Be it resolved by the State Board of Health*: (1) That the Secretary be and is hereby empowered to give written permission for the use of tight or leaching cesspools and to approve the site, plans and construction of septic tanks and filtration beds (sewage treatment plants) in accordance with the power vested in the State Board of Health by Sections 12600–255 and 12600–264 of the General Code; and, (2) That the Secretary be and is hereby directed to report to the State Board of Health at its regular monthly meetings his actions under Sections 12600-255 and 12600-264."

It was moved by Dr. Sutton, and seconded by Dr. Warner, that the resolution as read be adopted.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary recommended the employment during the summer months of R. M. Lee as assistant engineer, at a salary of $50.00 per month.

It was moved by Dr. Sutton, and seconded by Dr. Grube, to approve this recommendation.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Warner, and seconded by Dr. Grube, to approve the financial report, this being a statement of the expenditures from April 16th to and including April 30th, and a statement of balances available on May 1, 1913.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

Mr. Hill reported, as engineering committee, that owing to a pressure of work due to investigation of flood conditions it had been impossible for him to review the reports on engineering matters, and suggested that action on these reports be deferred until he had time to make a report.

It was moved by Dr. Sutton, and seconded by Dr. Grube, that Mr. Hill's request be granted and that the president be instructed to call a special meeting of the Board to consider the report as soon as it is ready for submission.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Miller, Sutton and Warner.

In the negative, none.

The Secretary presented a resolution adopted by the board of health of Cleveland, on May 8th, 1913, stating that the public water supply of that city is believed to be impure and dangerous to health and requesting the State Board of Health to make an investigation of the supply.

Dr. Miller stated that he had consulted the mayor of the city in regard to the complaint, and that it is the desire of the city officials that action under the Bense Act be not taken at this time, as it is the intention of the city officials to improve the water supply and that this can be done from the revenues of the water department.

No action was taken in this matter.

The Secretary presented a letter from the village solicitor of Caldwell, requesting that additional time be granted for the submission of a statement relative to the financial condition of the village as respects its ability to install a new water supply.

It was moved by Dr. Sutton and seconded by Dr. Grube that the village solicitor be instructed to submit his statement as soon after June 1st as possible, so that the advice of the Attorney General may be secured and action taken at the June meeting of the Board.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented a petition, signed by the health officer of Woodsfield, Mr. Louis Hoeffler, complaining of the condition of the public water supply of that village and requesting the Board to take action under the Bense Act to compel the Woodsfield Water Company to improve the quality of the supply.

The Board took up for consideration the report of its Engineering Department, which had investigated said supply, and the resolution adopted by the State Board of Health on January 22, 1913, declaring the necessity for the installation of a water purification plant prior to January 1, 1914; and it was moved by Mr. Hill, and seconded by Dr. Sutton that the Board find from the evidence before it that the public water supply of Woodsfield is unsuitable for domestic use; and that the Secretary be instructed to notify the officials of the Woodsfield Water Company that the Board has fixed 8 p. m., Thursday, the twenty-sixth day of June, 1913, at the Hotel Statler, Cleveland, Ohio, as the time and place, when and here the Woodsfield Water Company, by its officers or others, may have an opportunity to be heard and to show cause, if any, why the said company should not be required to install a water purification plant, of a design satisfactory to the State Board of Health, prior to January 1, 1914.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner. Nays, none.

The Secretary presented a resolution adopted by the council of the village of Chardon, asking the State Board of Health to investigate the sewerage conditions in that village and take action under the Bense Act to cause the abatement of nuisances created by the discharge of sewage.

It was moved by Dr. Miller, and seconded by Dr. Warner, that the complaint be referred to the Engineering Department for investigation and report.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner. Nays, none.

The Board then granted a hearing to representatives of the village of Plymouth, with reference to the enforcement of an order under date of November 13, 1912, requiring the installation of a water purification plant, the time having expired within which the plant was to have been constructed and in operation. The delegation consisted of Dr. Charles S. Walker, health officer, and Mr. A. V. Andrews, of Norwalk, village solicitor.

Mr. Andrews stated that council had been unable to decide on the source of a new water supply and that engineering advice had not been sought.

Dr. Walker stated that the public supply is not used for domestic purposes but admitted that connections had been made from kitchen sinks, yard hydrants, etc.

It was moved by Dr. Warner, and seconded by Dr. Sutton, that the time within which a water purification plant be installed at Plymouth be extended six months from May 13, 1913, and that the Governor and Attorney General be asked to approve the extension of time.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner. Nays, none.

The Secretary presented the application of Mrs. J. T. Black, for a renewal of her license to conduct a maternity boarding house and lying-in hospital at 633 West Spring Street, Lima, Ohio, providing for the care of one woman and one child.

It was moved by Mr. Hill, and seconded by Dr. Sutton, to grant the renewal of this license.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented a list of health officers who had been appointed by their respective councils to serve in lieu of a board of health.

It was moved by Dr. Sutton, and seconded by Dr. Warner, to approve these health officers.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary called attention to the Conference of State and Provincial Boards of Health of North America to be held in St. Paul, Minn., June 13 and 14, 1913. The Secretary was instructed to notify the President and Vice-President that under the provisions of a resolution adopted March 18, 1911, that they and the Secretary were delegated to attend this conference.

The Secretary presented a letter from Rupert Blue, Surgeon General, U. S. Public Health Service, calling attention to the 11th annual conference of the State and Territorial health authorities with the U. S. Public Health Service, to be held at the Hotel Radisson, Minneapolis, Minn., June 16th, 1913.

It was moved by Mr. Hill, and seconded by Dr. Warner, that Dr. Sutton be delegated to attend this conference as a representative of the Board, and that the Secretary be instructed to so inform Surgeon General Blue.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

It was moved by Dr. Grube, and seconded by Dr. Miller, that the President of the Board be authorized to appoint a substitute delegate at any time a regularly appointed delegate is unable to attend a meeting to which he is appointed.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Board then took up the matter of sewerage for Wapakoneta as presented by the representatives from that city.

It was moved by Dr. Warner, and seconded by Dr. Sutton, not to oppose the construction of an intercepting sewer provided that sewage treatment works be installed when required by the State Board of Health, and provided, further, that the city have a thorough study made of present sewerage conditions with detail plans for the intercepting sewer and general plans for sewage treatment works, and that these plans be submitted to the Board for approval within sixty days from this date, or by July 15, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

The Secretary presented a letter, under date of May 14, 1913, from Mr. J. R. Cowell, director of public service of Toledo, stating that he had employed Mr. R. Winthrop Pratt, of Cleveland, as consulting engineer, and that it would be impossible to submit to the Board at this time the plans required by the action of the Board of March 20, 1913.

Mr. Hill moved to grant an extension of time and to instruct the Secretary to notify the authorities of the city of Toledo that the Board would require that complete plans for sewerage and sewage treatment works for Ten Mile Creek and Swan Creek districts be submitted to the Board for approval within six months from this date, or by November 15, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

Dr. Miller brought up the matter of sewage disposal at Lakewood, as complained of by the council of Rocky River, and moved that this matter be taken up again by the committee to which the complaint had been previously referred. This motion was seconded by Dr. Grube.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Warner.

In the negative, none.

Mr. Hill made a verbal report of an investigation made by him of a complaint by the health officer of Cincinnati about the day nursery operated by Mrs. Annie Powell. He stated that rooms in which babies are kept are in a cleanly condition and suitable for the purpose. He further stated that this institution is not only a day nursery but children are kept night and day. As this brings the institution within the provisions of the law governing maternity hospitals, the Secretary was instructed to notify Mrs. Powell that she is operating in violation of law and that she will have to secure a license or quit the business. The Secretary was also instructed to request the health officer to give specifications in regard to his complaint.

Mr. Hill made a report in regard to typhoid fever in St. Bernard and Elmwood Place, and the matter was referred to the Secretary for investigation.

The Secretary called attention to the annual conference of boards of health for Northern Ohio and it was decided to postpone the conference until July.

On motion of Dr. Miller, seconded by Mr. Hill, it was voted to hold the next regular meeting of the Board in Cleveland, June 26, 1913.

On motion of Dr. Sutton, seconded by Dr. Grube, the Board adjourned.

Attest: E. F. McCampbell,
Secretary.

Approved June 26, 1913.

SPECIAL MAY MEETING
1913

A special meeting of the State Board of Health was held at the office of the Secretary, Columbus, Thursday evening, May 22d, 1913, at 8 o'clock.

Those present were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

The Secretary read the report of the engineering committee, the various questions being taken up as follows:

It was moved by Dr. Sutton, and seconded by Dr. Warner, to approve a proposed additional water supply for Swanton, to be obtained from a drilled well at a point about one-half mile west of the village, as shown on plans received from Mr. George Champe, of Toledo, consulting engineer, on May 5, 1913, subject to the following conditions:

1st. That all barns, barnyards, cesspools, privies, and other possible sources of pollution within 500 feet of the site of the wells be removed, and that privies within that distance be reconstructed and maintained in accordance with rules and regulations included in the Board's approval of the present water supply granted September 23, 1908.

2nd. That detailed plans of the development of the proposed additional supply be submitted to the State Board of Health.

3rd. That this approval shall be void unless the proposed additional supply shall have been installed prior to January 1, 1914.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary was instructed to advise the village authorities that thorough pumping tests be conducted to determine the availability of a sufficient supply before any considerable investment is made for equipment to develop the supply.

The Board then took up for consideration the resolution (No. 248) submitted by the council of the city of Painesville, complaining of a nuisance in Grand River and Lake Erie, and of the pollution of the water supply of Painesville, caused by the wastes discharged from the plant of The Diamond Alkali Company.

It was moved by Dr. Warner, and seconded by Dr. Sutton, to defer action under Sections 1250 and 1251 of the General Code, and to instruct the Secretary to advise the council of Painesville as follows:

1st. That investigations of the State Board of Health made June 24, 1912, and April 29, 1913, indicated that a serious nuisance was created in the Grand River by the discharge of wastes from The Diamond Alkali Company's plant.

2nd. That this nuisance is of such character as to be deleterious to the quality of the river water for use as a commercial water supply, but it is not shown to be detrimental to public health.

3rd. That previous examinations by the State Board of Health, made in May, 1910, indicated that pollution of the water supply by water from the Grand River was possible.

4th. That inasmuch as the city is now taking steps to improve its water supply a thorough investigation to determine the pollution of the supply by the discharge of the Grand River will be deferred until a later date.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner. Nays, none.

The Board then took up the complaint of the board of health of East Liverpool, that the public water supply of that city is believed to be impure and dangerous to health.

Having before it the report of its chief engineer, who had investigated the complaint, it was moved by Dr. Grube, and seconded by Dr. Sutton, that the Board find from the report that the public water supply of East Liverpool is impure and dangerous to health and that it is not practicable to sufficiently improve the character of the supply by removing the sources of pollution affecting it.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner. Nays, none.

Thereupon it was moved by Dr. Grube, and seconded by Dr. Sutton, that the Secretary be instructed to notify the authorities of East Liverpool of the Board's findings, and that the Board has fixed 8 p. m., Thursday, the twenty-sixth day of June, at the Hotel Statler, Cleveland, Ohio, as the time and place, when and where the city of East Liverpool, by its officers or others, may have an opportunity to be heard and to show cause, if any exists, why the city should not be required to install water purification works, satisfactory to the State Board of Health, prior to January 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner. Nays, none.

It was moved by Dr. Sutton, and seconded by Dr. Warner, to approve the proposed extension to the water supply of Youngstown, as shown on plans for the development of the Milton Reservoir, so-called, submitted by Mr. F. M. Lillie, city engineer, April 22, 1913, subject to the following conditions:

1st. That specifications satisfactory to the engineer of the State

Board of Health for clearing and stripping the reservoir site be submitted to the State Board of Health prior to the award of a contract for any portion of the reservoir construction.

2nd. That plans and estimates of cost for the extension of the water supply intake (a) to the proposed Milton Reservoir, (b) to the Mahoning River above Warren, and (c) to a source of water supply other than the Mahoning River be prepared and submitted to the State Board of Health, together with a definite statement from the city council adopting one of the plans and requesting its approval by the State Board of Health; and,

3rd. That this approval shall be void unless the foregoing second condition shall have been complied with prior to January 1, 1914, and an extension of the water supply intake in accordance with one of the aforesaid plans shall have been made prior to January 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary was instructed to call the attention of the authorities to the foregoing second and third conditions of approval, which require an extension of the water works intake, and to state that it is to be understood that no approval of the Milton Reservoir as an extension of the water supply of Youngstown has been granted until the said conditions have been complied with.

It was moved by Dr. Grube, and seconded by Dr. Sutton, to disapprove the plans for proposed additional sewerage for Sewer District No. 1, Conneaut, submitted by Mr. A. W. Pelton, director of public service, on March 19, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary was instructed to call the attention of the authorities to the following facts:

In a previous action of the State Board of Health, July 27, 1910, the city authorities were advised to take steps to improve conditions attending the discharge of sewage into Conneaut Creek, which advice has been disregarded.

The discharge of untreated sewage from Conneaut creates a nuisance in Conneaut Creek during dry weather, and at all times is a menace to the water supply of the city. The Board is of the opinion that no additional sewage should be discharged into the creek unless efficient sewage treatment works are provided, although it is probable that the sewage to be discharged from the proposed sewers will not greatly increase the pollution of the creek.

The Board would advise that the city engage a consulting sanitary engineer and have prepared plans for proper disposal of the sewage of the entire city.

It was moved by Dr. Warner, and seconded by Dr. Sutton, to approve the plans and specifications for proposed sewerage and sewage treatment works for Bexley, received from Mr. A. Elliott Kimberly, consulting engineer, April 11, 1913, subject to the following conditions:

1st. That no connections to the proposed sewers be permitted until,

a. The proposed sewage treatment works shall have been completed, and,

b. Provision for sewer flushing shall have been made by the installation of a public water supply.

2nd. That the village council enact an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers, and providing for a proper official to supervise the maintenance of the sewers and treatment works, and that within two months after the completion of the sanitary sewers and treatment works, all existing connections in violation of the said ordinance be abandoned and removed.

3rd. That samples of all filtering material be submitted to and receive the approval of the Engineer of the State Board of Health.

4th. That details of automatic apparatus to control the operation of the contact filters be submitted to the State Board of Health.

5th. That the sewage treatment works be enlarged, or otherwise modified, when required by the State Board of Health.

6th. That this approval shall be void unless the proposed sewers and sewage treatment works shall have been installed prior to October 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary was instructed to notify the authorities that the Board would advise:

1st. That the working head of the treatment works be so increased or modified as to produce a free flow in the main trunk sewer and through the various devices of the plant; and,

2nd. That flat grades of the sewerage system and probable low stage flow will necessitate frequent flushing of sewers to prevent stoppages.

It was moved by Dr. Sutton, and seconded by Dr. Warner, to approve plans for proposed storm sewerage for District C, Lorain, received from Mr. C. M. Osborn, city engineer, April 2, 1913, subject to the following conditions:

1st. That the city council pass an ordinance defining the proper use of the proposed system of storm sewerage and of all sanitary, combined, and storm sewers existing or constructed in the future; and that a copy of the said ordinance be submitted to the Secretary of the State Board of Health for approval prior to its passage.

2d. That this approval shall be void unless the aforesaid ordinance shall have been passed and the proposed system of storm sewers or main sewer thereof installed prior to July 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Board then took up the complaint of the board of health of the city of Cambridge that the public water supply of that city is believed to be impure and dangerous to the health of the consumers of said supply.

Having before it the report of its chief engineer, who has investigated the complaint, it was moved by Dr. Sutton, and seconded by Dr. Grube, that the Board find from the report that the public water supply of Cambridge is impure and dangerous to health and that it is not practicable to sufficiently improve the character of the supply by removing the sources of pollution affecting it.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner. Nays, none.

Thereupon it was moved by Dr. Sutton, and seconded by Dr. Grube, that the Secretary be instructed to notify the authorities of Cambridge of the Board's findings and that the Board has fixed 8 p. m., Thursday, the twenty-sixth day of June, at the Hotel Statler, Cleveland, as the time and place, when and where the city of Cambridge, by its officers or others, may have an opportunity to be heard and to show cause, if any exists, why a new water supply of satisfactory quality, or a water purification works to improve the quality of the existing supply, should not be installed prior to January 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner. Nays, none.

It was then moved by Dr. Warner, and seconded by Dr. Sutton, that the Board give the city of Cambridge another opportunity, at the meeting to he held June 26, 1913, to show cause, if any exists, why the city should not be required to install sewage treatment works; and that the Secretary be instructed to so notify the authorities.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner. Nays, none.

It was moved by Mr. Hartzell, and seconded by Dr. Sutton, to approve the plans for the proposed sewage treatment plant for the Maplewood Beach Hotel, near Cleveland, submitted by Mr. R. Winthrop Pratt, consulting engineer, April 17, 1913, subject to the following conditions:

1st. That the filter area be increased 50 per cent over that shown on the plans by the addition of a third unit.

2nd. That covers for the filters be provided to be used in case of excessive odor production and during the periods when the plant will not be in service.

3rd. That sludge be discharged from the sedimentation compartment only after the summer season has terminated, and when the water supply has been thrown out of service.

4th. That samples of the filtering material be submitted to and receive the approval of the State Board of Health before the material is placed in the filters.

5th. That this approval shall be void unless the sewage treatment plant shall have been constructed prior to July 1, 1913.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

It was moved by Dr. Sutton, and seconded by Dr. Warner, to disapprove proposed additional sewerage at Lima, to be constructed on Atlantic Avenue at private expense, according to a request received from Mr. B. Huber, March 29, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary was instructed to notify the authorities of Lima that the Board will not permit of the installation of additional sewers discharging into the Ottawa River until provision has been made for the proper disposal of the sewage of the entire city.

It was moved by Dr. Grube, and seconded by Dr. Sutton, to withhold approval of the plans for a proposed intercepting sewer for the Westwood District, Cincinnati, submitted by Mr. V. T. Price, director of public service, February 25, 1913, and to instruct the Secretary to advise the city officials:

1st. That it is the opinion of the State Board of Health,

a. The scheme of diverting the dry weather flow from the Westwood district to the Lick Run sewer by means of a tunnel is not feasible; and,

b. A more satisfactory and permanent solution of the problem of the pollution of Muddy Creek will be secured by extending an intercepting sewer from the existing outlet down stream to a suitable point of outlet, or to a suitable site for treatment works.

2nd. That the Bill will require the submission of definite plans and cost estimates in accordance with the foregoing advice within ninety days, or by August 22, 1913.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary presented a resolution of the board of county commissioners of Lucas County, requesting an extension of the time for installing the proposed Local Sanitary Sewer No. 1, Main Sewer District No. 2, to August 1, 1913.

It was moved by Mr. Hartzell, and seconded by Dr. Sutton, to revise the second condition of the Board's approval of the Local Sanitary Sewer No. 1, Main Sewer District No. 2, in Gradolph Avenue, West Toledo, granted December 12, 1912, to read as follows:

"2nd. That this approval shall be void unless the proposed sewer shall have been installed prior to August 1, 1913."

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary presented applications from the following persons for a renewal of their licenses to conduct a maternity boarding house and lying-in hospital:

Mrs. Jennie K. Barnes, in Huntsburg Township, Geauga County, with provisions for two women and four children.

The Florence Crittenton Home, 1166 East Main Street, Columbus, with provision for six women and twelve children.

Mrs. Ella Hastings, 928 Miller Avenue, Columbus, with provision for six children.

It was moved by Dr. Warner, and seconded by Dr. Sutton, to grant a renewal of these licenses.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary then presented a list of health officers, who had been appointed by their respective councils to serve in lieu of a board of health.

It was moved by Dr. Sutton, and seconded by Mr. Hartzell, to approve these health officers.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary presented the following resolution passed by the board of health of Dayton, May 15, 1913, and received May 19, 1913.

Be it resolved by the board of health of the city of Dayton, State of Ohio. That,

WHEREAS, The board of health of the city of Dayton, State of Ohio, has completed an examination and inspection of the canals and waterways owned by the State of Ohio, those owned by the Dayton Hydraulic Company, of Dayton, Ohio, and those controlled by the Cooper Hydraulic Company, of Dayton, Ohio, under lease from the State of Ohio, and has found such canals and waterways to be in an unsanitary condition, being filled in many places with foul smelling, stagnant water and with rubbish and filth, all of which is not conducive to the good health of the community, and,

WHEREAS, These canals and waterways have been practically abandoned, and are now only used to serve the purpose of furnishing power to a few manufacturing plants, now therefore,

Be it resolved by the board of health of the city of Dayton, State of Ohio:

That the canals and waterways owned by the State of Ohio, and located in the city of Dayton, Ohio, those owned by the Dayton Hydraulic Company and located in said city, and that portion of the canal system of the State of Ohio, located in said city and controlled under lease from the State of Ohio, by the Cooper Hydraulic Company, be and they are hereby declared to be public nuisances and a menace to the public health of the said city.

Further resolved, That the Ohio State Board of Health be requested to make a complete investigation of the above described waterways, in a manner provided by law, and that said Board be further requested to take such action as may be necessary and proper in order that an immediate abatement of said nuisances may be effected.

It was moved by Dr. Grube that this matter be referred to a committee for investigation and report. The motion was seconded by Dr. Warner.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The President appointed Dr. Grube and the chief engineer members of this committee.

The Secretary presented the resignation of Miss Alice M. Cohen as general clerk, and recommended that Miss Cohen's resignation be accepted and that she be appointed a stenographer and clerk in the Division of Tuberculosis, at a salary of $840.00 per year dating from June 1, 1913. He further recommended that Miss Helen O'Connor be transferred from the position of extra clerk to that of general clerk.

It was moved by Dr. Warner, and seconded by Dr. Sutton, to approve these recommendations.

Those voting in the affirmative were: Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary then recommended that Miss Rose Engle be appointed to a position of stenographer and clerk in the Division of Tuberculosis, at a salary of $720.00 per year, dating from June 1, 1913.

It was moved by Dr. Warner, and seconded by Dr. Grube, to approve this recommendation.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

The Secretary presented the matter of a public health exhibit in connection with the Division of Tubelculosis, and recommended that

Mr. W. E. Spencer, of Dayton, be appointed manager of the exhibits, at a salary of $1,500 per year, dating from June 1, 1913.

It was moved by Dr. Grube, and seconded by Dr. Warner, to approve this recommendation.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

Dr. Grube moved that the Secretary be instructed to not place on the calendar for Board meeting, any reports involving engineering matters, unless such reports had been sent to the members not later than the Saturday preceding the date of the Board meeting. This motion was seconded by Dr. Sutton.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton and Warner.

In the negative, none.

Upon motion of Dr. Sutton, seconded by Dr. Warner, the Board adjourned, to meet in Cleveland June 26, 1913.

Attest: E. F. McCampbell,
Secretary.

Approved June 26, 1913.

JUNE MEETING
1913

A regular monthly meeting of the State Board of Health was held at the Hotel Statler, Cleveland, Thursday evening, June 26th, 1913, at 8 o'clock.

There were present Messrs. Hasencamp, Hartzell, Grube, Miller, Sutton and Brown.

In response to a citation to the city of Cambridge, to show cause why the State Board of Health should not issue an order requiring the city to install a new water supply of satisfactory quality or a water purification works to improve the quality of the existing supply prior to January 1, 1915, there appeared the city solicitor, Mr. S. C. Carnes, who stated that the officials and citizens of the city realized the necessity of improving the public water supply and asked the Board to proceed with the issuing of an order as outlined in the citation.

As regards the complaint against the city of Cambridge for polluting Wills Creek with sewage and other wastes the solicitor requested the Board to postpone further action in the matter until the improvement of the water supply could be effected, and stated, as his opinion, that the city would take up the sewage proposition as soon as the other was taken care of.

The chief engineer explained that the suggestions of Mr. Carnes were along the line of his recommendations to the Board.

These matters were referred to executive session.

The president then called for representatives of the Woodsfield Water Company to answer to the citation relative to the public water supply of Woodsfield. There was no response.

In response to the call of the president, there appeared the following officials of the city of East Liverpool to answer the citation of the Board for a hearing on the condition of the public water supply of that city: J. S. Hilbert, member of board of health; Dr. R. J. Marshall, mayor; James Gilgallin, member of council; Chris. Horton, member of council, and F. F. Diebold, member of board of health.

The mayor explained that there was no division of opinion among the officials or citizens as to the necessity of providing an improved water supply but there was a difference of opinion as to the method to be followed and that the officials would offer no remonstrance against the issuing of an order by the State Board Health. The matter was also discussed by other members of the delegation and the members of the Board.

This matter was referred to executive session.

The Board then went into executive session.

It was moved by Dr. Grube, and seconded by Dr. Brown, to approve the minutes of the May 15, 1913, meeting of the Board.

Those voting in the affirmative were Messrs. Hasencamp, Miller, Grube, Hartzell, Sutton and Brown.

In the negative, none.

It was moved by Dr. Miller, and seconded by Dr. Sutton, to approve the minutes of the May Special meeting (May 22nd).

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton, Brown and Miller.

It was moved by Dr. Sutton, and seconded by Dr. Miller, to approve the monthly report of the Secretary, which included the recommendation that the following books be purchased:

The Conservation of the Child. By Dr. Arthur Holmes	$1 25
School Feeding, Its History and Practice at Home and Abroad. By Louise Stevens Bryant	1 50
Mouth Hygiene and Mouth Sepsis. By John Sayre Marshall, M. D. Sc. D.	1 50
Preventive Medicine and Hygiene. By Milton J. Rosenau	6 00
Prevention and Control of Disease. By Francis Ramaley and Clay E. Giffin	3 00
Commercialized Prostitution in New York City. By George J. Kneeland	1 42
Lang's German-English Medical Dictionary	5 00
"Human Engineering," one year's subscription	1 00

Those voting in the affirmative were Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented a number of recommendations which were taken up as follows:

1st. That the next meeting of the Board be held in Columbus at 8 p. m., July 23, 1913, in the office of the Secretary, and that the conference of local boards of health be held in Columbus, July 24th and 25th; also that the next following meeting of the Board be held at Cedar Point early in September.

It was moved by Dr. Grube, and seconded by Dr. Miller, to approve this recommendation.

Those voting in the affirmative were Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

2nd. That the appointment of Miss Sara Kerr and of Miss Loretta Gray as clerks, as authorized by a former action of the Board be confirmed.

It was moved by Dr. Sutton, and seconded by Dr. Brown, to approve these appointments.

Those voting in the affirmative were Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

3rd. That the Board confirm the appointment of Dr. E. R. Shaffer as medical inspector, to have charge of the outbreak of smallpox at Alvordton, compensation and expenses to be paid by the village.

It was moved by Dr. Sutton, and seconded by Dr. Miller, to confirm this appointment.

Those voting in the affirmative were Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

4th. That purchases of furniture and equipment needed to establish the Division of Tuberculosis and the Division of Occupational Diseases be approved, and that the Secretary be authorized to incur the expense necessary in assembling the public health exhibit without having to wait for action by the Board.

It was moved by Dr. Grube, and seconded by Dr. Brown, to approve these recommendations.

Those voting in the affirmative were Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

5th. That the telephones in the Secretary's residence, which are largely used in the Board's business, be paid for by the Board.

It was moved by Dr. Sutton, and seconded by Dr. Miller, to approve this recommendation.

Those voting in the affirmative were Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

6th. That the Secretary be authorized to appoint such inspectors as may be needed in the survey of occupational diseases for such time as they may be needed, and at a compensation to be fixed by the Secretary.

It was moved by Dr. Grube, and seconded by Mr. Hartzell, to approve this recommendation.

Those voting in the affirmative were Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

7th. That the Board adopt the following resolutions in regard to an advisory committee on Tuberculosis:

WHEREAS, The Ohio State Board of Health has recently organized a Division of Tuberculosis, and

WHEREAS, The Ohio Society for the Prevention of Tuberculosis has been instrumental in a large degree in securing the necessary legislative sanction for such a Division of Tuberculosis, and

WHEREAS, It is desirable that the voluntary forces now existing in the state for combating tuberculosis shall continue as an active agency in promoting the further extension of the anti-tuberculosis propaganda; therefore be it

Resolved, That the Ohio State Board of Health desires to promote the closest possible co-operation between the official and voluntary agencies in the fight against tuberculosis as represented by the Ohio Society for the Prevention of Tuberculosis; and be it further

Resolved, That the Ohio State Board of Health invites the Executive Committee of the Ohio Society for the Prevention of Tuberculosis to act as an advisory committee to the Board and its Secretary and Executive Officer; and that such advisory committee be invited to meet with the Secretary and Executive Officer of the Board not less than once a year at a stated time and place to be agreed upon and as often as the services of such advisory committee may be deemed necessary.

It was moved by Dr. Sutton, and seconded by Dr. Brown, to adopt the above resolution.

Those voting in the affirmative were Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

8th. That the Secretary be authorized to prepare if possible such an exhibit on public matters as would be suitable for use at the Fourth International Congress on School Hygiene to be held in Buffalo, N. Y., August 25-30, 1913.

It was moved by Dr. Sutton, and seconded by Dr. Grube, to approve this recommendation.

Those voting in the affirmative were: Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Grube, and seconded by Dr. Miller, to approve the Financial Statement, this being a statement of the expenditures from May 1, 1913, to and including June 15, 1913, and a statement of balances available on June 16, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown.

In the negative, none.

The Board then took up the question of the water supply for the city of Cambridge. Mr. S. C. Carnes, city solicitor, having appeared and having stated that the city waived any claim of a hearing and asked that the Board proceed with its order, it was moved by Dr. Grube, and seconded by Dr. Sutton, that the report of the Board's chief engineer and recommendations therein contained be approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown. Nays, none.

It was thereupon moved by Dr. Grube and seconded by Dr. Sutton that the improvements and changes recommended in said report be and the same are hereby declared necessary and should be made, and that the city of Cambridge be ordered to install a new water supply of satisfactory quality. or a water purification plant to improve the quality of the existing water supply prior to January 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown. Nays, none.

Thereupon, it was moved by Dr. Grube, and seconded by Dr. Sutton, that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown. Nays, none.

The Board then took up the question of sewage treatment works for Cambridge and the request of the city solicitor that further action be postponed until the improvement in the water supply had been made.

It was moved by Dr. Grube, and seconded by Dr. Sutton, to postpone further action in regard to the sewage treatment works.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown. Nays, none.

The question of the complaint against the water supply of East Liverpool was taken up. An opportunity having been given the officials of East Liverpool to be heard, and the said officials finding no valid evidence, protest or remonstrance against the action or findings heretofore made, it was moved by Dr. Sutton, and seconded by Dr. Miller, that the report of the Board's chief engineer and the recommendations therein contained be approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown. Nays, none.

It was thereupon moved by Dr. Sutton, and seconded by Dr. Miller, that the improvements or changes recommended in said report be and the same are hereby declared to be necessary and should be made, and that the city of East Liverpool be ordered to install water purification works, satisfactory to the State Board of Health, prior to January 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown. Nays, none.

Thereupon, it was moved by Dr. Miller, and seconded by Dr. Sutton, that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown. Nays, none.

The question of the complaint against the water supply of Woodsfield was taken up. An opportunity having been given the Woodsfield Water Company to be heard, and the said company having failed to appear and having filed no valid evidence, protest or remonstrance against the action or findings heretofore made, it was moved by Dr. Grube, and seconded by Dr. Brown, that the report of the Board's chief engineer and the recommendations therein contained be approved and confirmed.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Miller, Hartzell, Grube, Sutton and Brown. Nays, none.

It was thereupon moved by Dr. Brown, and seconded by Dr. Sutton, that the improvements recommended in said report be and the same are hereby declared to be necessary and should be made, and that the Woodsfield Water Company be ordered to install a water purification plant of a design satisfactory to the State Board of Health prior to January 1, 1914.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown. Nays, none.

Thereupon, it was moved by Dr. Brown, and seconded by Dr. Sutton, that the report and findings of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown. Nays, none.

The question of the complaint against the water supply of Caldwell was taken up for consideration.

The Secretary presented a statement received from the village solicitor on June 21st, such statement having been submitted in compliance with a former action of the Board by which the village was required to furnish full information in regard to the taxable value of the village property, bonded indebtedness and other information relating to the financial standing of the village. The statement as submitted gave the total amount of the tax duplicate and the list of outstanding bonds but did not give the information that would be necessary to determine the ability or inability of the village to provide the necessary funds for the introduction of a public water supply.

The village of Caldwell, through its officials, having been given an opportunity to be heard at the meeting of the Board held April 17, 1913, and having filed no valid evidence or protest against the necessity of the introduction of a new water supply but basing its remonstrance solely on the ground of inability to provide the necessary funds, a matter over which the Board has no supervision, and these matters having been brought to the attention of the Board, it was moved by Dr. Sutton and seconded by Dr. Grube that the report of the chief engineer of the Board and the recommendations therein contained be now approved and confirmed.

The roll call upon the adoption of this motion resulted as follows:

Yeas, Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown. Nays, none.

It was thereupon moved by Dr. Brown, and seconded by Dr. Sutton, that the Board declare the public water supply of Caldwell to be impure and dangerous to the health of the consumers of the supply, and that the said village be ordered to provide a new water supply of satisfactory quality prior to November 1, 1914.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown. Nays, none.

Thereupon it was moved by Dr. Brown, and seconded by Dr. Sutton, that the report and findings of the Board be transmitted to the Governor and Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown. Nays, none.

The Secretary presented the matter of sending inspectors outside the state for the purpose of getting information not otherwise obtainable.

It was moved by Dr. Grube, and seconded by Dr. Miller, to authorize the Secretary to have such investigations made when necessary to secure the information.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented the report of the Engineering Committee and the matters were taken up in the following order:

It was moved by Dr. Sutton, and seconded by Dr. Miller, to approve a proposed additional water supply for Athens, to be obtained from drilled wells north and west of the existing supply wells Nos. 6 and 7 and south and east of the Hocking River, in accordance with the request received from Mr. R. D. Williams, director of public service on May 2, 1913, subject to the following conditions:

1st. That the proposed additional wells, and such existing wells as are retained in use, shall be developed according to plans approved by the State Board of Health; said plans to provide substantial watertight cisterns, a watertight cast iron gravity conduit, and an elevation of the cisterns and collecting well above maximum high water of the Hocking River;

2nd. That prior to June 1, 1914, all existing wells, excepting Nos. 6 and 7, shall be abandoned;

3rd. That the council shall pass an ordinance prohibiting the establishment or maintenance of any leaching privy vault, or cesspool, or other source of pollution of the public water supply, within 500 feet of any well; and,

4th. That this approval shall be void unless plans for the development of the proposed additional supply shall have been submitted prior to September 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary was instructed to advise the authorities as follows:

1st. Analytical evidence indicates that the existing water supply is contaminated by the influence of privy vaults near the wells;

2nd. The development of the existing wells is unsafe owing to the possibility of contamination of the supply through the cisterns and gravity conduit; and,

3rd. The territory lying north and west of the existing wells Nos. 6 and 7, and south and east of the Hocking River, is free from polluting influences and should be developed to provide for the abandonment of wells Nos. 1 to 5.

It was moved by Dr. Grube, and seconded by Dr. Sutton, to approve the plans prepared by Mr. R. Winthrop Pratt, consulting engineer, and submitted by The Wiltsie Realty Company, of Toledo, on May 22, 1913, for a proposed temporary sewage treatment plant for Sub-District No. 3, Main District No. 3, Lucas County, subject to the following conditions:

1st. That the proposed temporary sewage treatment plant be abandoned and removed as soon as the commissioners of Lucas County shall have provided proper disposal of the sewage from Main Sewer District No. 3, and that the period of use of the plant shall not exceed one year;

2nd. That a competent man to attend to the operation of the plant be employed by the Wiltsie Realty Company, or by the commissoners of Lucas County;

3rd. That the filtering material shall be approved by the Engineer of the State Board of Health before the same is placed; and,

4th. That this approval shall be void unless the proposed temporary sewage treatment plants shall have been constructed prior to October 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Brown, and seconded by Dr. Sutton, to approve the proposed additional water supply for Nelsonville, to be developed according to plans prepared by Mr. Arthur Giesler, consulting engineer, and received from Mr. C. C. Sharp, director of public service, June 10, 1913, subject to the following conditions:

1st. That the city council pass an ordinance, approved by the Secretary of the State Board of Health, preventing the establishment or maintenance of any leaching privy vault, cesspool, or other possible source of contamination of the water supply within 500 feet of any public supply well;

2nd. That the quality of the proposed additional water supply, as demonstrated by the analyses of samples collected subsequent to pumping tests of the wells, shall be satisfactory to the State Board of Health;

3rd. That a deferrization plant to remove the excessive iron content of the water be installed when required by the State Board of Health; and,

4th. That this approval shall be void unless the aforesaid ordinance shall have been passed prior to September 1, 1913, and the proposed additional water supply shall have been installed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Grube to approve the general plans, received from Mr. Victor T. Price, director of public service of Cincinnati, June 10, 1913, for a proposed intercepting sewer for the Duck Creek Intercepting Sewer District, Cincinnati, with a temporary discharge into the Little Miami River, subject to the following conditions:

1st. That prior to January 1, 1920 (at which time the tributary population to the proposed intercepting sewer is estimated at 50,000) (a) the proposed outlet shall be abandoned and the proposed intercepting sewer shall be extended to connect with an intercepting sewer along the north bank of the Ohio River, or (b) sewage treatment works of a design satisfactory to the State Board of Health shall be constructed to treat the dry weather flow of the proposed intercepting sewer before it is discharged into the Little Miami River;

2nd. That complete detailed plans of the proposed Duck Creek intercepting sewer shall be submitted to and receive the approval of the State Board of Health before contracts for the construction of the same shall have been awarded; and,

3rd. That this approval shall be void unless the aforesaid detailed plans shall have been submitted prior to October 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Brown and seconded by Dr. Sutton to approve general plans for a proposed sewage treatment plant for Akron, received June 18, 1913, from Mr. R. Winthrop Pratt, consulting Engineer, subject to the following conditions:

1st. That complete detailed plans for the proposed sewage treatment plant shall be submitted to and receive the approval of the State Board of Health;

2nd. That in connection with such plans data on the volume of sewage flow, as obtained from extensive measurements, shall be submitted to the State Board of Health; and,

3rd. That this approval shall be void unless the aforesaid detailed plans shall have been submitted prior to December 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary was instructed to inform the authorities that in granting an approval of the general plans, the Board sanctions the installation of a plant comprising as its essential features sedimentation tanks and sprinkling filters at the site shown on the plans, but will hold in abeyance approval of details of the proposed plant pending the submission of complete detailed plans.

It was moved by Dr. Grube and seconded by Dr. Brown to approve the proposed new water supply for Frankfort, to be obtained from drilled wells on the property owned by the village, located between the Cincinnati, Hamilton and Dayton Railroad and the north fork of Paint Creek, and to be developed according to plans of The W. J. Sherman Company of Toledo, consulting engineers, submitted June 17, 1913, subject to the following conditions:

1st. That the wells shall be cased through the gravel deposits and obtain their entire supply from the underlying rock formations;

2nd. That the quality of the proposed supply, as demonstrated by samples collected subsequent to an adequate pumping test, shall be satisfactory to the State Board of Health;

3rd. That the village council shall pass an ordinance, satisfactory to the State Board of Health, to prevent the establishment or maintenance of any leaching privy vault, cesspool, or other possible source of contamination of the water supply within 500 feet of the public supply wells; and,

4th. That this approval shall be void unless the proposed water supply shall have been installed prior to July 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Miller to approve general plans for a proposed new sewage treatment plant for Canton, prepared by Mr. R. Winthrop Pratt, consulting engineer and submitted by Mr. Ray F. Harbert, director of public service, May 27, 1913, subject to the following conditions:

1st. That complete detailed plans for the proposed new sewage treatment plant be submitted to and receive the approval of the State Board of Health; and,

2nd. That this approval shall be void unless the aforesaid detailed plans shall have been submitted prior to October 1, 1913, and the proposed sewage treatment plant shall have been constructed prior to January 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary was instructed to inform the authorities that in granting an approval of the general plans, the Board sanctions the installation of a plant comprising as its essential features sedimentation tanks and contact filters at the site shown on the plans, but will hold in abeyance approval of details of the proposed plant pending the submission of complete detailed plans.

It was moved by Dr. Brown and seconded by Dr. Sutton to approve plans for a proposed sewage treatment plant for Bedford, submitted by Mr. L. R. Landfear, village solicitor, May 13, 1913, jointly prepared by Messrs. W. J. Watson and C. W. Courtney, engineers for the village, and Mr. R. Winthrop Pratt, consulting engineer, subject to the following conditions:

1st. That the design of the proposed sewage treatment plant be modified by the addition of bypass facilities to be used during excessive storm flows; and that revised plans incorporating such features satisfactory to the State Board of Health, be submitted;

2nd. That all grades of filtering material be approved by the engineer of the State Board of Health before the material is placed, and that sand be used as a filtering material in the sludge filter, and graded gravel or stone be used as a support for the contact material;

3rd. That a competent operator be employed to attend to the maintenance and operation of the intercepting sewers and sewage treatment plant;

4th. That intermittent sand filters, as shown on the plans, be constructed when deemed necessary by the State Board of Health; and,

5th. That this approval shall be void unless the proposed sewage treatment plant shall have been constructed prior to August 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Brown to approve the plans submitted June 13, 1913, by Mr. R. K. Schlafly, designing engineer, for a proposed private sewer and sewage treatment plant to be constructed by Mrs. E. H. Kauffman, in Clinton Township, Franklin County, near Columbus, subject to the following conditions:

1st. That the population connected to the proposed sewer shall not exceed thirty;

2nd. That no sludge shall be discharged from the tank except during high stages of the Olentangy River; and,

3rd. That this approval shall be void unless the proposed sewer and sewage treatment plant shall have been installed prior to October 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Miller to approve the plan for the enlargement of the water purification plant of The Conneaut Water Company at Conneaut, submitted by Messrs. Burgess and Long, consulting engineers, March 21, 1912, and the plans for controlling apparatus submitted by Mr. Lee Harvey, superintendent of said company, April 21, 1913, subject to the following conditions:

1st. That additional clear well capacity be installed when deemed necessary by the State Board of Health;

2nd. That accurate records of the operation of the plant be maintained and furnished to the State Board of Health at monthly intervals; and,

3rd. That this approval shall be void unless the proposed loss of head gauges and rate controlling and indicating apparatus shall have been installed prior to August 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary was instructed to advise the water company that the clear well capacity represents only a small period of storage and that with high rates of pumping is inadequate to make possible a constant rate of operation of the filters.

It was moved by Dr. Grube and seconded by Dr. Brown to approve the Jones tract, so-called, shown on a plan received from the W. J. Sherman Company, consulting engineers, May 12, 1913, as a location for sewage treatment works for Granville.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Sutton to approve the plan for proposed sewerage and sewage treatment plant for Farmdale, received from Mr. F. A. Roberts, secretary of The Farmdale Improvement Company, April 30, 1913, subject to the following conditions:

1st. That devices, satisfactory to the engineer of the State Board of Health, for secondary treatment of the sewage by intermittent sand filters or subsurface irrigation tile be installed before any connections to the proposed sewer for sanitary purposes are permitted; and,

2nd. That this approval shall be void unless revised plans incorporating a suitable design for secondary treatment of the sewage shall be submitted prior to August 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The request of the board of county commissioners of Lucas County, received May 27, 1913, for an extension of the approval of the Board granted January 22, 1913, for proposed sewerage for Sub-district No. 3, Main Sewer District No. 3, Lucas County, was taken up, and it was moved by Dr. Miller and seconded by Dr. Sutton to revise the first and fourth conditions of said approval to read as follows:

"1st. That comprehensive plans for sewerage and sewage treatment for Main Sewer District No. 3 be submitted to the State Board of Health by the county commissioners of Lucas County prior to November 1, 1913."

"4th. That this approval shall be void unless the proposed sewerage for Sub-district No. 3, Main Sewer District No. 3, Lucas County, and sewage treatment works for the same shall have been constructed prior to October 1, 1913."

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Miller to approve a proposed water supply for Centerburg, to be developed according to plans received from Mr. H. L. Maddocks, consulting engineer for the village, May 31, 1913, subject to the following conditions:

1st. That a deferrization plant shall be installed to remove the iron from the water before it is pumped into the mains;

2nd. That the village council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, prohibiting the establishment or maintenance of any leaching privy vault or cesspool or other possible source of pollution of the water supply within 500 feet of any of the wells;

3rd. That an additional area of at least three-fourths acre contiguous to, and south of the present property be acquired for water works purposes; and,

4th. That this approval shall be void unless detailed plans for a deferrization plant shall have been submitted prior to September 1, 1913, and the proposed water supply shall have been installed prior to September 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary was instructed to advise the authorities to arrange for extensive pumping tests as a first step in the installation of the proposed supply; and that previous investigations by the State Board of Health have indicated the danger of inadequacy of a ground water supply at

Centerburg, and this question should be determined before the water works equipment as a whole has been installed.

It was moved by Dr. Brown and seconded by Dr. Sutton to hold in abeyance the question of the necessity of an extension of the water works intake at Sandusky until the improvement of the water purification plant and the installation of the intercepting sewers and sewage treatment works shall have been completed; and to accept the plans and estimates of cost for the extension of the intake to a location in Lake Erie, received from Mr. Robert L. J. Wagar, city engineer, department of public service, May 13, 1913, and submitted to comply with conditions imposed by the State Board of Health in actions taken June 19, 1912, October 23, 1912, and November 21, 1912.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Miller to approve the general plans for proposed additional sewerage (South District), intercepting sewers, and sewage treatment plant for Sandusky, received from Mr. Robert L. J. Wagar, chief engineer, department of public service, May 13, 1913, subject to the following conditions:

1st. That a complete statement of the area and population tributary, and the dry weather sewage flow of each of the existing sewer outlets, be submitted to the State Board of Health;

2nd. That the design of the proposed sewage treatment plant be revised;

(a) By providing for at least three months' sludge retention based upon a population tributary of 25,000, and,

(b) By providing suitable devices for measuring and recording the sewage flow;

3rd. That the proposed intercepting sewers be extended to divert the sewage discharge from all existing outlets prior to January 1, 1915;

4th. That a competent operator shall be employed to attend to the operation and maintenance of the intercepting sewer system and treatment plant;

5th. That the council pass an ordinance regulating the proper use of sanitary and storm water sewers; said ordinance to be approved by the Secretary of the State Board of Health prior to its passage; and.

6th. That this approval shall be void unless contracts for the installation of the proposed additional sewerage (South District), intercepting sewer west of Mills Street and sewage treatment plant shall have been awarded prior to March 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary was instructed to notify the authorities that the Board would advise that in granting the foregoing approval it is recognized that an improvement in the disposal of sewage at Sandusky is necessary regardless of the water supply of the city; and with the completion of the intercepting sewers and sewage treatment plant an improvement in the quality of the water obtained from Sandusky Bay may be expected.

It was moved by Dr. Brown and seconded by Dr. Sutton to approve the plans for proposed improvement of the sewage treatment plant at Fostoria, received from Mr. A. B. Hollenbaugh, director of public service, May 31, 1913, subject to the following conditions:

1st. That improved devices for the secondary treatment of the sewage be provided when deemed necessary by the State Board of Health;

2nd. That daily records of operation of the plant be maintained and that a summary of such records be submitted to the State Board of Health at monthly intervals;

3rd. That the city council pass an ordinance prohibiting the discharge into sewers of manufacturing wastes detrimental to the sewage treatment plant;

4th. That revised plans incorporating minor changes in the design, satisfactory to the engineer of the State Board of Health be submitted; and,

5th. That this approval shall be void unless the proposed improvement of the sewage treatment plant shall have been made prior to January 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Brown to approve the proposed new water supply for Rossford, to be obtained from drilled wells, approximately 500 feet deep, located on the present property of The Edward Ford Plate Glass Company, to be developed according to plans submitted by said company June 21, 1913, subject to the following conditions:

1st. That detailed plans, satisfactory to the engineer of the State Board of Health, showing the proposed well devolopment including devices for pumping the wells and method of conveying the water to the collecting well, shall be submitted to the State Board of Health;

2nd. That well No. 2 shall not be used as a source of water supply unless provision is made by an independent pump, or otherwise, to prevent the contamination of the well supply by river water in the process of pumping;

3rd. That all valves on connections between the distribution and the emergency supply from the Maumee River shall be placed in substantial boxes provided with locks, the keys for which shall be retained by a dependable employe of The Edward Ford Plate Glass Company, and by the health officer of Rossford; and,

4th. That this approval shall be void unless revised detailed plans showing the above mentioned features shall have been submitted to the State Board of Health prior to August 1, 1913, and the equipment shall have been provided in accordance with such plans prior to November 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Sutton to approve the proposed new water supply for the Athens State Hospital, obtained from drilled wells in the valley of the Hocking River about one-quarter mile north of the institution buildings and developed according to plans received from the Ohio Board of Administration, May 23, 1913, subject to the following conditions:

1st. That an iron removal plant of a design satisfactory to the State Board of Health shall be installed;

2nd. That the collecting conduit of vitrified sewer pipe shall be replaced with a cast iron pipe line with leaded joints;

3rd. That a gate valve shall be provided on the overflow line from the collecting well;

4th. That the sewage from the water works pumping station shall be disposed of in a manner satisfactory to the State Board of Health; and,

5th. That this approval shall be void unless revised plans incorporating these features shall have been submitted to the State Board of Health prior to October 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Brown to adopt the report of the special committee on an investigation of the sanitary conditions of the hydraulic and transportation canals at Dayton.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary was instructed to send a copy of the report to the superintendent of public works, the Dayton Hydraulic Company, the Cooper Hydraulic Company of Dayton, and to the board of health of that city.

The Secretary presented a resolution adopted by the trustees of Munson Township, Geauga County, on June 23, 1913, asking the State Board of Health to investigate the pollution of the inlet entrance of Bass Lake by sewage and other wastes from the village of Chardon.

It was moved by Dr. Miller and seconded by Dr. Grube to refer this petition to the engineering department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented a resolution adopted by the Board of county commissioners of Summit County, on June 24, 1913, asking the State Board of Health to investigate the pollution of the Cuyahoga River by sewage and other wastes from the village of Cuyahoga Falls.

It was moved by Dr. Brown and seconded by Dr. Grube to refer this petition to the engineering department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented a resolution adopted by the board of county commissioners of Summit County, June 23, 1913, asking the State Board of Health to investigate the pollution of Little Cuyahoga River by sewage and other wastes from the city of Akron.

It was moved by Mr. Hartzell and seconded by Dr. Sutton to refer this petition to the engineering department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented a resolution adopted by the board of county commissioners of Mahoning County, adopted June 2, 1913, asking the State Board of Health to investigate the pollution of Honey Creek by sewage and other wastes from the plant of the Wire, Welsh and Company, located in Springfield Township, Mahoning County.

It was moved by Dr. Sutton and seconded by Dr. Miller to refer the petition to the engineering department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented a resolution adopted by the trustees of Marion Township, Franklin County, May 31, 1913, asking the State Board of Health to investigate the pollution of Alum Creek by sewage and other wastes from the Franklin County Infirmary.

It was moved by Dr. Miller and seconded by Dr. Sutton to refer this petition to the engineering department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Brown and seconded by Dr. Miller to approve the rules adopted by W. C. Williamson, health officer of Laura, serving in lieu of a board of health, the said rules being those recommended by the State Board of Health.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented a list of health officers, appointed by their respective councils to serve in lieu of a board of health.

It was moved by Dr. Sutton and seconded by Dr. Brown to approve these health officers.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented the application of Eleanor Smith to conduct a maternity boarding house and lying-in hospital at the rear of 163 North Ohio Avenue, Columbus, with provision for two children.

It was moved by Dr. Grube and seconded by Dr. Miller to grant this license.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented the application of The Florence Crittenton Home, 1161 McGuffey Street, Youngstown, for a renewal of its license to conduct a maternity boarding house and lying-in hospital at that address, provision being made for ten women and ten children.

It was moved by Dr. Grube and seconded by Dr. Brown to grant a renewal of this license.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

The Secretary presented the application of Lida M. Bowers to conduct a maternity boarding house and lying-in hospital at 2302 Cherry Street, Toledo.

On motion of Dr. Brown, seconded by Dr. Sutton, this application was rejected.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Miller that the engineering department be instructed to investigate the sanitary condition of the canal system of the state, whenever, in the regular work of the department, the engineers are in localities where state canals exist.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

It was moved by Dr. Sutton and seconded by Dr. Miller that the

September meeting of the Board be held at Cedar Point, on September 2nd, at 8 P. M., and that the Secretary be instructed to make necessary arrangements for the meeting.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Miller, Grube, Sutton and Brown.

In the negative, none.

There being no further business, the Board adjourned.

Attest: E. F. McCampbell,
Secretary.

Approved: July 23, 1913.

JULY MEETING
1913

A regular meeting of the State Board of Health was held at the office of the Secretary, Columbus, at 8 P. M., July 23, 1913.

There were present, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

The Board took up for consideration the complaint of the board of county commissioners of Summit County, Ohio, that the village of Cuyahoga Falls is discharging and permitting to be discharged, sewage and other wastes into the Cuyahoga River and by reason thereof is so corrupting said stream as to give rise to foul and noxious odors, thereby creating conditions detrimental to the health and comfort of the citizens of the village of Cuyahoga Falls who reside in the vicinity of said stream.

The Secretary read the recommendations contained in the report of the chief engineer; and it was moved by Dr. Grube, seconded by Dr. Brown, that the Board find from the report of its chief engineer, who had investigated the complaint, that the Cuyahoga River at and below the village of Cuyahoga Falls is polluted by the sewage and other wastes from said village and that conditions thereby created are detrimental to the health and comfort of the citizens of Summit County residing in the vicinity of said stream.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was then moved by Mr. Hill and seconded by Dr. Brown, that the authorities of the village of Cuyahoga Falls be given an opportunity to appear before the Board and to show cause, if any exists, why the village should not be required to install necessary sewers and sewage treatment works prior to January 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

Mr. F. F. Felmly, village solicitor of Cuyahoga Falls, then appeared before the Board and presented a resolution, adopted by the village council July 18, 1913, acknowledging the justice of the complaint and waiving the right of a hearing.

It was thereupon moved by Mr. Hill and seconded by Dr. Sutton that the report of the chief engineer be approved and confirmed, and that the Board adopt the following order:

Be it ordered by the State Board of Health of the State of Ohio, that the village of Cuyahoga Falls install and have in operation prior to January 1, 1915, necessary sewers and sewage treatment works to correct the conditions as set forth in the petition of the board of commissioners of Summit County, received by the State Board of Health June 25, 1913, and as found and determined by the said Board from an investigation made July 11, 1913.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

Thereupon, on motion of Mr. Hill, seconded by Dr. Sutton, the Secretary was instructed to transmit this order to the Governor and the Attorney General for their approval.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Sutton, Hill, Miller and Brown. Nays, none.

The Board took up for consideration a report by the chief engineer upon his investigation of the sewage pumping stations and sewage treatment works at Columbus.

It was moved by Mr. Hill and seconded by Dr. Grube that a copy of this report be furnished the director of public service of Columbus, and that he be notified that the Board will require that improved and more constant operation, or, if necessary, additional equipment of the sewage pumping stations be provided to pump the entire dry weather flow of sewage to the sewage treatment plant to prevent the pollution of the Scioto River and Alum Creek by raw sewage.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Grube that the Secretary be instructed to notify the director of public service of Columbus, that at the next regular meeting of the Board, September 2, at 8 P. M., Cedar Point, Ohio, the city of Columbus would be given an opportunity to be heard and to show cause, if any exists, why the said city should not be required to cease polluting the waters of the Scioto River and Alum Creek by the discharge of untreated sewage into said streams.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary read a letter from Mr. J. H. Meyer, city engineer of Wapakoneta, stating that owing to various delays it had been impossible to complete the plans for an intercepting sewer within the time allotted to them. It was further stated that Mr. A. Elliott Kimberly, of Columbus, had been engaged as consulting engineer on the work and that the plans and estimate would be ready for action by council on July 23, 1913.

Mr. Hill moved that as soon as the plans are submitted they be referred to the chief engineer and engineering committee, and if approved by them that authority be given the city officials to advertise; the committee to report to the Board at its next regular meeting.

This motion was seconded by Dr. Brown.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Mr. Hill to approve the minutes of the June meeting.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Grube to approve the monthly report of the Secretary, which included the recommendation that "Tuberculin in Diagnosis and Treatment" by Louis Hamman and Samuel Wolman, at $3.00 net, be purchased.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Mr. Hartzell to approve the Financial Statement, this being a statement of the expenditures from June 30th to and including July 9, 1913, and a statement of balances available on July 10, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

Mr. Hill presented his report, as engineering committee, and the matters were taken up in the following order:

It was moved by Dr. Sutton and seconded by Dr. Brown that the proposed improvement in the water supply of Geneva, consisting of the construction of a new storage dam, according to plans and specifications received from Messrs. Burgess and Long, consulting engineers, June 6, 1913, be approved subject to the following conditions:

1st. That the reservoir shall be cleaned and stripped of organic growths when deemed necessary by the State Board of Health; and,

2nd. That this approval shall be void unless the proposed dam shall have been installed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the authorities that in order to facilitate future cleaning of the reservoir provision should be made in the design for drawing off the contents of the reservoir to low water elevation of the stream.

It was moved by Dr. Brown and seconded by Dr. Grube to approve the general plans for a proposed water purification plant for Steubenville, prepared by Messrs. Chester and Fleming, consulting engineers, and submitted June 26, 1913, by Mr. D. S. Sinclair, representing the council of the city, subject to the following conditions:

1st. That before contracts for the installation shall have been awarded detail plans incorporating revisions in design satisfactory to the State Board of Health shall be submitted to and receive the approval of the State Board of Health; and,

2nd. That this approval shall be void unless the aforesaid plans shall have been submitted prior to December 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the city authorities and their consulting engineers that the foregoing action of the Board is an approval of the general features of the proposed water purification plant, and that the approval of its location and details of design will be held in abeyance pending the submission of complete detail plans.

The Secretary was instructed to also advise them that in connection with the preparation of detail plans, the improvement of the existing distributing reservoirs should be considered; that one of the low service reservoirs is unfit to serve as a receptacle for filtered water, and to prevent the development of algal growths it may be necessary to provide covers for all the reservoirs used

It was moved by Dr. Miller and seconded by Dr. Sutton to approve the plans for proposed additional sewerage for Gallipolis, received from Mr. H. L. Cadot, mayor, June 23, 1913, subject to the following conditions:

1st. That plans for a comprehensive system of sewers for the entire city shall be prepared, adopted by the council and submitted to the State Board of Health for approval, such plans to provide for the collection of the dry weather sewage flow to one point of discharge at a location suitable for the ultimate construction of sewage treatment works;

2nd. That Y branches for connections to the proposed sewer shall be placed opposite each lot fronting the line of the sewer;

3rd. That a detail plan of the proposed outlet satisfactory to the engineer of the State Board of Health shall be submitted to the State Board of Health; and,

4th. That this approval shall be void unless (1) a plan to comply with the foregoing third condition of approval shall have been submitted prior to September 1, 1913; and (2) plans to comply with the foregoing first condition of approval shall have been submitted prior to January 1, 1914

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Brown and seconded by Dr. Miller to approve the plans for proposed additional sewerage and sewage treatment works for Mt. Vernon, received from Mr. R. Winthrop Pratt, consulting engineer, July 15 and 17, 1913, subject to the following conditions:

1st. That the proposed sedimentation tank and sludge filters shall be installed and ready for operation before connections with additional sewers shall have been made; and that secondary treatment of the sewage, satisfactory to the State Board of Health, shall be provided at such time as the tank shall fail to produce an effluent properly disposed of by dilution in the Kokosing River;

2nd. That the city shall appoint an official to have general charge of the maintenance of the proposed sewers and sewage treatment works;

3rd. That the city council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers, and providing for the discontinuance and removal of existing connections in violation of the provisions of the said ordinance; and,

4th. That this approval shall be void unless contracts for the installation of additional sewerage and sewage treatment works shall have been awarded prior to April 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Brown and seconded by Dr. Grube to approve a proposed new water supply for Granville, to be obtained at a depth of 125 feet, from two drilled wells located on the site of the present supply wells, as outlined in a communication received July 16, 1913, from Mr. C. D. Coons, secretary of the board of trustees of public affairs, subject to the following conditions:

1st. That the village shall have a complete study of available sources of water supply made by an experienced engineer, with a view to securing a permanent water supply of satisfactory quality;

2nd. That all improvements to be made at the site of the existing and new wells, including the pumping station equipment, shall be installed in a manner to permit of the economical transfer of the entire equipment to a new location should it be found advisable to secure a new site for the supply wells; and,

3rd. That this approval shall be considered void unless the plans for a permanent water supply shall have been submitted to the State Board of Health for approval prior to July 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to call the attention of the authorities to the advice given by the State Board of Health in its action of February 15, 1912, which was as follows:

1st. That the present supply, installed in 1884, while originally of excellent quality now shows evidence of remote contamination, and that this supply should be abandoned before its quality has become seriously impaired by the built up portion of the village;

2nd. That the water from the proposed new well, obtained at a depth of 125 feet, while of satisfactory quality from a sanitary standpoint, contains an excessive iron content which will cause complaint on the part of the consumers unless a process for its removal is provided.

3rd. That in view of these facts it appears advisable, in securing a new water supply, that the village obtain a more satisfactory location for wells at a point beyond the influence of contamination from the village, where water of entirely satisfactory quality may be secured.

It was moved by Dr. Brown and seconded by Dr. Grube that the plans for proposed sewerage and sewage treatment plant for Renker Avenue, S. W., Cleveland, received from The Wm. H. Evers Engineering Company, June 16th and 28th, 1913, be approved subject to the following conditions:

1st. That samples of filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

2nd. That the owners of the sewer and sewage treatment plant shall employ a caretaker to visit the plant at least twice each week to attend to its proper operation;

3rd. That the entire plant shall be abandoned and removed as soon as sanitary sewers for the district shall have been constructed by the city of Cleveland;

4th. That the filter area shall be enlarged in a manner satisfactory to the State Board of Health when the population tributary shall have exceeded fifty; and,

5th. That this approval shall be considered void unless the proposed sewer and sewage treatment plant shall have been constructed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Sutton to approve detail plans for a proposed water purification plant for Painesville, received from Mr. R. Winthrop Pratt, consulting engineer for the city, June 23, 1913, subject to the following conditions:

1st. That the proposed bypass between the filtered water and raw water suction lines whereby raw water may be pumped into the mains shall be omitted;

2nd. That all grades of filtering material shall receive the approval of the engineer of the State Board of Health before being placed;

3rd. That the type of filter controlling and indicating apparatus shall be satisfactory to the engineer of the State Board of Health;

4th. That the city shall employ a competent analyst experienced in water purification to superintend the operation of the plant; and that the daily records of the operation of the plant shall be submitted to the State Board of Health at monthly intervals; and,

5th. That this approval shall be void unless contracts for the installation of the plant shall have been awarded prior to October 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Sutton and seconded by Mr. Hartzell to approve the general plans for proposed additional sewerage (north and south districts) for Greenfield, received from Mr. J. D. Strang, village engineer, June 14, 1913, subject to the following conditions:

1st. That before the contract for the installation of the sewers is awarded detail plans for the proposed sanitary sewers for the north and south districts shall be submitted to the State Board of Health; the said plans to include location, sizes, grades, manholes, flush tanks and other accessories to the sewers;

2nd. That the existing outlet of the sanitary sewer system shall be abandoned and the outlet sewer extended to a suitable site for sewage treatment works below the confluence of Paint Creek and the Case mill race;

3rd. That the village council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, defining and requiring the proper use of sanitary and storm water sewers and providing for the abandonment and removal of all existing improper connections to sanitary and storm water sewers;

4th. That a sewage treatment plant shall be installed when deemed necessary by the State Board of Health; and,

5th. That this approval shall be void unless the foregoing first, second and third conditions of approval shall have been complied with and the proposed additional sewerage shall have been installed prior to July 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the authorities of Greenfield that the present water supply of the village is unsafe for domestic consumption and should be abandoned; that in taking the foregoing action permitting the installation of additional sewerage without the immediate provision of sewage treatment works, the State Board of Health recognizes the fact that in the interest of the health of the village the provision of a new water supply of satisfactory quality should precede the installation of sewage treatment works, and that the Board will expect the submission of plans for a new water supply prior to December 1, 1913.

It was moved by Dr. Grube and seconded by Dr. Brown to approve the plans and specifications for proposed additional sewerage in Jefferson Street, Port Clinton, received from Mr. C. E. DeWitt, village engineer, June 7, 1913, subject to the following conditions:

1st. That the proposed sewer shall not discharge into the Portage River and that a temporary outlet into Lake Erie east of the Portage River shall be established;

2nd. That complete detail plans providing for the collection at one point and proper disposal of the sewage from the entire village shall be submitted to the State Board of Health; and,

3rd. That this approval shall be void unless plans complying with the foregoing first condition of approval shall have been submitted prior to September 1, 1913; and unless plans complying with the foregoing second condition shall have been submitted prior to January 1, 1914; and unless proper disposal of the sewage of the village shall have been provided prior to January 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the authorities of Port Clinton that the discharge of sewage into the Portage River is a menace to the quality of the water supply of the village and the discharge of sewage into Lake Erie east of the Portage River creates a nuisance; that in granting conditional approval of the proposed additional sewerage with a temporary outlet into Lake Erie, the Board recognizes the necessity of providing adequate drainage for the districts to be sewered but will insist that proper measures be taken to prevent the contamination of the water supply and the creation of a nuisance in Lake Erie; and that an expert should be employed to provide a satisfactory and economical remedy for the present unsanitary conditions.

It was moved by Dr. Brown and seconded by Dr. Grube to approve the plans for sewerage and sewage treatment for the Interstate Stock Yards Company, Toledo, received June 19, 1913, from Mr. H. W. Robinson, Secretary of the company, subject to the following conditions:

1st. That the design of the proposed septic tank shall be revised in a manner satisfactory to the engineer of the State Board of Health by providing proper facilities for the removal and disposal of sludge;

2nd. That devices for secondary treatment of the sewage shall be installed when deemed necessary by the State Board of Health; and,

3rd. That this approval shall be void unless the proposed sewerage and sewage treatment plant (satisfactorily revised) shall have been installed prior to November 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Grube to approve the plan for the proposed sewerage and sewage treatment for the yards of the Michigan Central Railroad at Toledo, received from Mr. J. F. Deimling, engineer of construction, May 27, 1913, subject to the following conditions:

1st. That an outlet other than the proposed sewer be provided for the flow from a ditch, draining approximately 100 acres, proposed to be diverted to the sewer;

2nd. That the design of the septic tank shall be revised in a manner satisfactory to the engineer of the State Board of Health by providing proper facilities for the removal and disposal of sludge;

3rd. That the proposed septic tank shall be abandoned and removed at such time as an outlet for the proposed sewer shall have been provided by the construction of an intercepting sewer along Ten Mile Creek by the city of Toledo; and,

4th. That this approval shall be void unless the proposed sewerage and sewage treatment plant (satisfactorily revised) shall have been installed prior to January 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Board then took up for consideration the complaint of the trustees of Marion Township, Franklin County, that the Franklin County Infirmary, located in Marion Township, is discharging and permitting to be discharged sewage and other wastes into Alum Creek, and by reason thereof is so corrupting said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Marion Township, Franklin County, Ohio, who reside in the vicinity of said creek.

Having before it the report of the chief engineer, who had investigated the complaint, it was moved by Mr. Hill and seconded by Dr. Grube, that the Board find, from the report of its chief engineer, that Alum Creek at and below the sewer outlet of the Franklin County infirmary is polluted by the sewage and other wastes from the institution, and that the discharge of the sewage from the tuberculosis hospital, nearing completion, will increase the pollution and create conditions detrimental to the health and comfort of the citizens of Marion Township, Franklin County, residing in the vicinity of said stream.

The roll call upon the adoption of this motion resulted as follows:

Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Mr. Hill and seconded by Dr. Grube that the Secretary be instructed to notify the board of county commissioners of Franklin County of the Board's findings and to state that the Board has fixed Tuesday, the second day of September, 1913, at 8 P. M., "The Breakers," Cedar Point, Ohio, as the time and place, when and where the board of county commissioners may have an opportunity to be heard and to show cause, if any exists, why they should not be required to install sewage treatment works prior to July 1, 1914.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board took up for consideration the complaint of the board of commissioners of Summit County, Ohio, that the city of Akron, Summit County, is discharging and permitting to be discharged sewage and other wastes into the Little Cuyahoga River, and by reason thereof is so corrupting said stream as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Summit County, Ohio, who reside in the vicinity of said stream.

Having before it the report of its chief engineer, who had investigated the complaint, it was moved by Dr. Grube and seconded by Mr. Hartzell that the Board find, from the report of its chief engineer, that the Little Cuyahoga River at and below the city of Akron is polluted by sewage and other wastes from said city, and that the conditions thereby created are detrimental to the health and comfort of the citizens of Summit County residing in the vicinity of said stream.

Roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Dr. Miller and seconded by Dr. Sutton that the Secretary be instructed to notify the authorities of the city of Akron of the Board's findings and to state that the Board has fixed 8 P. M., Tuesday, the second day of September, 1913, at "The Breakers" Cedar Point, Ohio, as the time and place, when and where the city of Akron, by its officers, or others, may have an opportunity to be heard and to show cause, if any exists, why the said city should not be required to install sewage treatment works prior to June 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board took up the complaint of the board of county commissioners of Mahoning County, that the Wire, Welsh and Company Distillery, located in Springfield Township, Mahoning County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Honey Creek, and by reason thereof is so corrupting said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Springfield Township, Mahoning County, who reside in the vicinity of said creek.

Having before it the report of its chief engineer, who had investigated the complaint, it was moved by Dr. Brown and seconded by Mr. Hartzell that the Board find that the wastes from the distillery of the Wire, Welsh and Company, at New Middletown, Springfield Township, Mahoning County, Ohio, do not pollute Honey Creek to an extent to give rise to foul and noxious odors and thereby create conditions detrimental to the health and comfort of the citizens of Springfield Township, Mahoning County, who reside in the vicinity of said creek.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

On motion of Dr. Brown, the Secretary was instructed to notify the board of county commissioners of Mahoning County, Ohio, of the Board's findings.

The Board took up for consideration the complaint of the trustees of Munson Township, Geauga County, Ohio, that the village of Chardon is discharging and permitting to be discharged sewage and other wastes into the entrance of Bass Lake, and by reason thereof is so corrupting said natural water course as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of the township who reside in the vicinity of the said watercourse.

Having before it the report of its chief engineer, who had investigated the complaint, it was moved by Dr. Brown and seconded by Dr. Miller that the Board find, from this report, that the small tributary to the Chagrin River (Bass Lake inlet) at and below the village of Chardon is polluted by the sewage and other wastes from the said village, and that the conditions thereby created are detrimental to the health and comfort of the citizens of Munson Township, Geauga County, residing in the vicinity of said stream.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Dr. Brown and seconded by Mr. Hartzell that the Secretary be instructed to notify the authorities of the village of Chardon of the Board's findings and to state that the Board has fixed Tuesday, 8 P. M., the second day of September, 1913, at "The Breakers," Cedar Point, Ohio, as the time and place, when and where the village, by its officers or others, may have an opportunity to be heard and to show cause, if any exists, why the village should not be required to install sewerage and sewage treatment works prior to January 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

Dr. Grube brought up the matter of the pollution of Ten Mile and Swan Creeks at the city of Toledo, citing the fact that at a meeting held February 20, 1913, the Board had found that both of these creeks were seriously polluted; that at a subsequent hearing, March 20, 1913, representatives of the city of Toledo had failed to show cause why the conditions should not be improved by the construction of intercepting sewers and sewage treatment works, and that following this hearing the Board did not adopt an order directing the city to install the necessary improvement.

It was then moved by Dr. Grube and seconded by Dr. Brown that the Board now adopt and confirm the report of its chief engineer presented at the February 20, 1913 meeting.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Dr. Grube and seconded by Dr. Brown that the Board adopt the following order in reference to Ten Mile Creek: Be it ordered by the State Board of Health of the State of Ohio, that the city of Toledo, Lucas County, Ohio, install and have in operation within two years from the date of the approval of this order by the Governor and the Attorney General, the necessary intercepting sewer and sewage treatment works to correct the conditions in Ten Mile Creek, as set forth in the petition received by the State Board of Health from the trustees of Washington Township, Lucas County, Ohio, December 31, 1910, and as found and determined by the said Board from the investigation made February 11, 1913, and other evidence presented at a meeting of the Board held March 20, 1913.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Dr. Grube and seconded by Dr. Brown that the Board adopt the following order in reference to Swan Creek: Be it ordered by the State Board of Health of the State of Ohio, that the city of Toledo, Lucas County, install and have in operation within two years from the date of the approval of this order by the Governor and the Attorney General, the necessary intercepting sewer and sewage treatment works to correct the conditions in Swan Creek, as set forth in the petition received by the State Board of Health from the council of the city of Toledo, September 13, 1910, and as found and determined by the said

Board from the investigation made February 11, 1913, and other evidence presented at a meeting of the Board held March 20, 1913.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

Thereupon it was moved by Dr. Grube and seconded by Dr. Brown that the findings and orders of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

Dr. Grube brought up the matter of the pollution of Massie Creek at Cedarville by the discharge of wastes from the strawboard works, and moved that it be referred to the engineering department for investigation and report.

This motion was seconded by Dr. Sutton. Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton and Brown.

In the negative, none.

Mr. Hill presented the matter of a reconsideration of the action taken by the Board May 22, 1913, withholding approval of the plans for a proposed intercepting sewer for the Westwood District, Cincinnati, as requested by the director of public service in a communication of June 28, 1913, and moved that the Board do not rescind its former action.

This motion was seconded by Dr. Miller. Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented communications from the council and clerk of the city of Greenville, with reference to the pollution of Greenville Creek and the appointment of referee engineers, as provided in Section 1257 of the General Code; and stating that Mr. A. Elliott Kimberly, of Columbus, had been appointed to act on behalf of the city of Greenville. The Secretary stated that the Attorney General had been asked for advice as to the action to be taken by the Board and that the Attorney General in a written opinion had informed the Board that it would be advisable to accede to the request.

It was moved by Mr. Hill and seconded by Dr. Grube that an investigation of Greenville Creek at Greenville be made by the chief engineer and the engineering committee, and that a report be presented at the next meeting of the Board.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a petition from the board of health of Canton, Stark County, Ohio, asking the State Board of Health to investigate the contamination of Nimishillen Creek by the sewage and other wastes from the city of Canton.

It was moved by Dr. Miller and seconded by Dr. Brown that this complaint be referred to the chief engineer for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a complaint from the trustees of Canton Township, Stark County, of the pollution of Nimishillen Creek by the sewage and other wastes from the city of Canton, and asking the Board to make an investigation.

It was moved by Dr. Miller and seconded by Dr. Brown that this complaint be referred to the chief engineer for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented Part 4, Sanitation, of the Ohio Building Code, which had been revised by the State Inspector of Plumbing, in accordance with instructions given November 5, 1912, and recommended that this revised code be adopted as rules and regulations of the State Board of Health.

It was moved by Mr. Hill and seconded by Dr. Miller that this revised code be adopted as rules and regulations of the Board.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

This revised code follows:

RULES AND REGULATIONS FOR THE CONSTRUCTION OF PLUMBING AND DRAINAGE.

PREAMBLE.

These rules and regulations shall apply to and include all sanitary work, installation or equipment hereafter installed, constructed or altered in, for or about a building or structure of any kind, class or character, or used, or to be used for any purpose whatsoever.

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DEFINITION OF TERMS.

A Waste Pipe is any pipe which receives the discharge of any fixture except water closets and conveys the same to the soil pipe or house drain.

Soil Pipe is any pipe which conveys the discharge of water closets with or without other fixtures, to the house drain.

House Drain is that part of the horizontal piping of a house drainage system which receives the discharge of all soil, waste and other drainage pipes inside the walls of any building and conveys the same to the house sewer, three feet outside the foundation wall of such building.

House Sewer or Main Drain is that part of the horizontal piping beginning three feet from the foundation wall to its connection with the main sewer or cesspool.

A Vent Pipe is any pipe provided to ventilate a drainage and plumbing system of piping and to prevent siphonage and back pressure.

A Back Vent Pipe is that part of a vent pipe line which connects directly with an individual trap underneath or back of the fixture, and extends either to the branch, main soil or waste vent.

Soil or Waste Vent is that part of the main soil or waste pipe above the highest installed branch or fixture connection, extending through the roof.

Conductors or Roof Leaders are conveyors which carry the storm or rain water from the roofs of buildings to the house or yard drain. The term Down Spout is usually applied to the vertical portion.

Local or Surface Vent is a pipe by which the foul air in bowls or water closets or other plumbing fixtures, is removed.

Subsoil Drain is that part of a drainage system which conveys the subsoil or ground or seep water from the foot of walls or below the cellar bottom under buildings, to the house sewer, but independent of the house drain.

Trap is a fitting so constructed as to prevent the passage of air or gas through a pipe without materially affecting the flow of sewage or waste water therein.

Traps—Depth of Seal is the height of the water column measured between the points of overflow and the dip or division level separating the inlet and outlet arms of the trap.

"Plumbers Work" shall include all piping in a building upon which tests are required to a point three (3) feet outside the foundation walls and shall include the house drain, soil and waste stacks, conductors and roof leaders.

TITLE I.

Size of Pipes.

Sec. 1. Size of House Drains, Soil and Waste Stacks, Mains and Branches. Twenty (20) square feet of roof or yard area in horizontal projection counts as one fixture.

Three feet of urinal trough or wash sink counts as one fixture.
One bath, basin or sink or smaller fixture counts as one fixture.
One pedestal urinal or slop hopper sink counts as two fixtures.
One water closet counts as four fixtures.
Dimensions given refer to the inside diameter.

Maximum Number of Fixtures Connected to

Size of pipe	Waste, Soil and Waste Combine		Soil Pipe Alone	
	Branch	Main	Branch	Main
1¼"	1 fixture	1 fixture		
1½"	2 fixtures	3 fixtures		
2 "	4 fixtures	8 fixtures		
2½"	5 fixtures	10 fixtures		
3 "	10 fixtures	20 fixtures	1 water closet	2 water closets
3½"	20 fixtures	40 fixtures	1 water closet	2 water closets
4 "	32 fixtures	64 fixtures	8 water closets	16 water closets
5 "	72 fixtures	144 fixtures	18 water closets	36 water closets
6 "	144 fixtures	288 fixtures	36 water closets	72 water closets
7 "	252 fixtures	504 fixtures	63 water closets	126 water closets
8 "	420 fixtures	840 fixtures	105 water closets	210 water closets
9 "	580 fixtures	1,160 fixtures	145 water closets	290 water closets
10 "	800 fixtures	1,600 fixtures	200 water closets	400 water closets
11 "	1,060 fixtures	2,120 fixtures	265 water closets	530 water closets
12 "	1,420 fixtures	2,840 fixtures	355 water closets	710 water closets

Providing that the number of water closets on any soil pipe, with or without other fixtures, shall never exceed the number given in either of the last two columns.

The number of fixtures in a building shall determine the size of the house drain and the area of the soil or waste stacks shall not be less than the area of the house drain.

If earthenware drains or sewers are used the diameter of the pipe shall be increased one size over the above table.

Sec. 2. Size of Fixture Traps and Wastes. The size (inside diameter) of the trap and waste branches for a given fixture shall never be less than the following:

Kind of fixtures	Size in inches	
	Trap	Branch
Water closet	3	3
Slop sink with trap combined..............................	3	3
Slop sink ordinary..	2	2
Lip urinal	1½	1½
Pedestal urinal	3	3

Kind of fixtures	Size in inches	
	Trap	Branch
Floor drains or wash	3	3
Yard drains or catch basins	3	3
Urinal troughs	2	2
Laundry tub	1¼	1¼
Kitchen sinks (residence)	1¼	1¼
Kitchen sinks (large) hotels or public	2	2
Pantry sinks (large) hotels or public	2	2
Pantry or bar sinks	1¼	1¼
Wash basins, one only	1¼	1¼
Bath tubs	1½	1½
Shower baths	2	2
Sitz bath	1½	1½
Safe wastes and drips	1	1
Drinking fountains	1¼	1¼
Fountain cuspidors	1¼	1¼

Sec. 3. Size of Vent Pipe Stacks. The following table gives the size of vent pipes and the maximum number of fixtures that they shall serve:

Size of Pipe	Maximum developed length in feet	Number of traps in 1½ or less	Number of traps 2"	Number of Water C.
1¼" pipe	15	1 (1¼" trap)		
1½" pipe	25	3	1	
2 " pipe	40	12	6	3 or less
2½" pipe	60	24	12	6
3 " pipe	90	48	24	12
3½" pipe	130	100	50	25
4 " pipe	180	160	80	40
5 " pipe	240	210	140	70
6 " pipe	330	480	240	120

For five (5) inch traps and over the vent shall be one-half the diameter of the trap except as prescribed in Title XI, section 86 — Latrines.

If the length of a branch or main vent pipe is to exceed the given maximum, the above diameter must be increased to the tabulated size opposite the length required, irrespective of the number of traps vented, but in no case shall the main vent be less than one-half the diameter of the adjoining soil pipe.

Sec. 4. Size of Local Vent Pipe Stacks. In the following table the unit of a local vent for a single water closet, pedestal urinal, urinal bowl, slop hopper or sink, and to each three feet of urinal or gutter shall be a two (2) inch pipe.

Size of Pipe	Maximum developed length in feet. Mains	Number of Closets vented	
		Branches	Main vertical part
2"	40	1	1
3"	100	3	6
4"	150	6	12
5"	200	10	20
6"	250	16	32
7"	300	23	46
8"	350	32	64
9"	400	42	84
10"	450	56	112
11"	500	72	144
12"	550	90	180

The dimensions given refer to the inside diameter of pipe.

Where the number of fixtures exceeds the limit of the tables, sizes and lengths shall be increased in corresponding ratio.

TITLE II.

MATERIALS, QUALITY AND WEIGHTS.

Sec. 5. Earthenware Pipe. Quality of Pipe. All earthenware pipe and fittings shall be of the hub and spigot pattern, cylindrical in section, thoroughly vitrified through the thickness of the pipe, and thoroughly salt glazed over the entire inner and outer surfaces. Each length shall be of a uniform caliber, smooth bore throughout, without twist or wind, and free from fire cracks, blisters, flaws or other defects.

Earthenware pipe used for tile drains shall be without hub or socket, and can be either cylindrical or D shaped in section.

Sec. 6. Cast Iron Pipe. A. Quality of Pipe. All cast iron pipe and fittings shall be sound, cylindrical and smooth, free from cracks, sand holes and other defects, of a uniform thickness and not lighter than the commercial grade known as "Extra heavy."

B. Weights of Cast Iron Pipe. Pipe shall not weigh less than the following per lineal foot, which weights include the hubs:

Diameter of Pipe	Weights per Ft.
2 inch	5½ pounds
3 inch	9½ pounds
4 inch	13 pounds
5 inch	17 pounds
6 inch	20 pounds
7 inch	27 pounds
8 inch	33½ pounds

C. Coating for Cast Iron Pipes and Fittings. All pipe shall be coated at the factory for underground use with asphaltum or coal tar pitch.

Pipes and fittings above ground may be plain or coated with linseed oil, coal oil, asphaltum or coal tar pitch.

Sec. 7. Wrought Iron and Mild Steel Pipe. A. Thickness and Weight of Pipe. All wrought iron or mild steel pipe used for soil, waste or vent pipes shall be galvanized, and not lighter than the commercial grade known as "Full weight."

B. The fittings for wrought iron or mild steel waste, soil and refrigerator waste shall be cast or malleable iron or brass recessed drainage fittings, with smooth interior waterway and threads tapped out of solid metal, so as to give a uniform grade to branches of not less than ¼ of an inch per foot.

C. Threaded fittings for soil, waste and vent pipes shall be brass, galvanized malleable iron or cast iron.

Sec. 8. Lead Pipe. Weights of Lead Pipe. All pipe used for branch soil, waste, vent or flush pipes shall be of best quality of drawn pipe, of not less weight per lineal foot than shown in the following table:

Lead branch soil, waste, vent or flush pipes including bends and traps.

Internal Diameter	Weights per Ft.
1 inch	1 lb. 8 oz.
1¼ inch	2 lb. 8 oz.
1½ inch	3 lb. 8 oz.
2 inch	4 lb. 0 oz.
3 inch	6 lb. 0 oz.
4 inch	8 lb. 0 oz.

Sec. 9. Brass Pipe and Fittings. Brass pipe for soil, waste and vent pipe shall be thoroughly annealed, seamless drawn or brazed tubing having weight and outside diameter of not less than the folowing:

Nominal Diameter	Gauge No. B. & S.	Thickness	Weights
1¼"	12	5–64"	1.08 lb.
1½"	12	5–64"	1.32 lb.
2 "	12	5–64"	1.79 lb.
2½"	10	7–64"	2.82 lb.
3 "	10	7–64"	3.41 lb.
4 "	8	1–8 "	5.74 lb.
5 "	8	1–8 "	7.22 lb.
6 "	8	1–8 "	8.71 lb.

For flush and local vents No. 18 gauge may be used. Drawn tubing only shall be used for the larger sizes, two and one-half (2½) inches to six (6) inches, and brazed tubing may be used for the smaller sizes, one and one-quarter (1¼) to two (2) inches.

Brass fittings shall be good quality cast brass having a thickness in their walls not less than the tabular thickness given above for the corresponding brass pipe. The thickness of the tapped ends to be one and one-half (1½) times the thickness of the corresponding pipe.

Brass Ferrules. Brass Ferrules shall be best quality extra heavy cast brass, not less than four and one-half (4½) inches long and 2¼, 3½ and 4½ inches in diameter, and not less than the following weights:

Diameters	Weights
2¼ inches	1 lb. 0 oz.
3½ inches	1 lb. 12 oz.
4½ inches	2 lb. 8 oz.

Cup or similar ferrules shall conform with the above table.

Soldering Nipples. Soldering nipples shall be heavy cast brass, or of brass pipe iron pipe size. When cast, they shall be full bore and not less than the following weights:

Diameters	Weights
1¼ inches	0 lb. 6 oz.
1½ inches	0 lb. 8 oz.
2 inches	0 lb. 14 oz.
2½ inches	1 lb. 6 oz.
3 inches	2 lb. 0 oz.
4 inches	3 lb. 8 oz.

Cleanouts. Screw caps for cleanouts shall be of extra heavy brass, not less than ⅛ of an inch thick. The screw cap shall have a solid square or hexagonal nut not less than one inch high. The body of a cleanout ferrule shall be at least equal in weight and thickness, to the calking ferrule of the same size of pipe. The engaging part shall have no less than six threads of iron pipe size, and be tapered.

Sec. 10. Sheet Lead. Sheet lead for roof flashing shall not weigh less than three (3) pounds per square foot, and shall extend not less than six (6) inches from the pipe and the joint shall be made water-tight.

Sec. 11. Copper. Copper tubing when used for inside roof conductors or leader connections shall be seamless drawn tubing, not less than number fourteen (14) B. & S. gauge; and when copper is used for roof conductor or leader flashings it shall be not less than number eighteen (18) B. & S. gauge, and for local vents and interior ventilating pipe, may be spiral of gauge number twenty-six. (26).

TITLE III.

JOINTS AND CONNECTIONS.

Sec. 12. Water and Air Tight Joints. All joints and connections prescribed under this title shall be made gas and water-tight.

Sec. 13. Earthenware Pipes. Joints between the hub and spigot shall be half filled with a gasket of oakum and then by finishing the joint with mortar made of one (1) part fresh Portland cement and two (2) parts clean sharp sand.

Each joint shall be carefully banked, wiped and cleaned.

Sec. 14. Earthenware to Iron Pipe. Underground joints between earthenware and iron pipe shall be made the same as above prescribed for earthenware pipe.

Sec. 15. Cast Iron Pipe. All joints in cast iron shall be made with pure lead well calked, and not less than one (1) inch deep, and no paint, varnish or putty will be allowed until the joints have been tested.

Oakum or other efficient method shall be used to prevent the lead from running through the joint.

Sec. 16. Wrought Iron, Mild Steel and Brass Pipe. Joints in galvanized iron, mild steel or brass pipe shall be standard screw joints, and all burs or cuttings shall be removed. All joints shall be made up of white or red lead or mineral paint.

Sec. 17. Wrought Iron, Mild Steel and Brass to Cast Iron. Connections between wrought iron mild steel or brass to cast iron shall be either a calked joint (section 15) or screwed joint (section 16).

All unions used on the sewer side of traps shall be ground faced and shall not be concealed or enclosed.

No slip joint connection will be allowed on the sewer side of the trap.

Sec. 18. Lead Pipe. Joints in lead pipe, or between lead pipes and pipes of brass or copper shall have an exposed surface of the solder to each side of the joint of at least three-quarters (¾) of an inch.

Sec. 19. Lead to Iron Pipe. Joints between lead and iron pipes shall be made by extra heavy cast or drawn screw nipple, with either a calked joint or a soldered nipple with a threaded joint or approved concaved brass bushings.

Where cup or similar ferrules are used they shall extend not less than one-quarter (¼) inch above the hub.

Sec. 20. Earthenware with Metal Floor Connections. Fixtures with earthenware traps connected directly with soil or waste pipes shall have a solid brass floor plate not less than three-sixteenths (3/16) of an inch thick, soldered to the lead bend or pipe, and screwed to the floor where joists are of wood, and where brass or iron is used, screwed to the same, and bolted to the trap flange. Joint shall be made gas tight with an asbestos graphite ring, asbestos string gasket, washer, red or white lead, or perfect screw joint.

In wooden joist construction the connection between the earthenware and soil pipe shall have at least two (2) inches of lead pipe between the wiped joint and the under side of the floor.

Sec. 21. Increasers and Reducers. Where different sizes of pipe or pipes and fittings are to be connected, proper size increasers or reducers, pitched to an angle of forty-five (45) degrees between the two sizes shall be used.

Sec. 22. Prohibited Joints. Any fitting or connection which has an enlargement, chamber or recess with a ledge, shoulder or reduction of the pipe area in the direction of the flow on the outlet or drain side of any trap is prohibited.

Sec. 23. Expansion Bolts. Connections or hangers, pipe supports, or fixture settings with masonry or stone backing shall be made with expansion bolts without the use of wood plugs.

TITLE IV.

TRAPS AND CLEANOUTS.

Sec. 24. Traps. A. Where Used. Each single fixture, except those wasting as prescribed under Title XI, Section 86, shall be separately trapped by a water seal trap, placed as close to the fixtures as possible.

A set of not more than three wash trays or wash stands, or a set of one or two wash trays with sink combined, may connect with a single trap, provided the trap is placed central and the branches connect into the seal of the trap.

B. Kind of Traps. Every trap shall be self-cleaning. No form of trap which depends upon the action of movable parts for its seal shall be used. No trap which depends upon concealed interior partitions for its seal or which has an interior partition that, in case of defect, would allow the passage of sewer air, shall be used.

Traps for bath tubs, basins, sinks or other similar fixtures shall be made of lead, brass, galvanized iron, or of iron porcelain enameled inside.

Galvanized or porcelain enameled iron traps shall be extra heavy full bore, and have a smooth interior water way and threads tapped out of solid metal.

Iron drum traps shall be made of extra heavy cast or malleable iron, galvanized or porcelain enameled on the inside and the drum shall not exceed four (4) inches in diameter. Drum traps shall have a water seal of not more than seven (7) inches nor less than two (2) inches.

Every drum trap shall be so installed that the water seal will protect the trap screw from sewer air.

C. Water Seal. Each trap shall have a water seal of not less than two (2) inches.

D. Cleanouts and Vent Connections. Each trap except those in combination with fixtures where the trap seal is plainly visible and accessible shall be provided with a brass trap screw.

Traps placed between the floor shall have a brass trap screw for cleaning, in plain view or flush with the floor, or readily accessible from or under the floor.

E. Trap Levels and Protection. All traps shall be rigidly supported and set true with respect to their water level, and shall be so located as to protect their seals.

F. Traps Prohibited on Drains. There shall be no trap at the foot of soil or waste pipe stacks upon the house drain or house sewer except where such drain or sewer is used exclusively for conducting rain water or surface water to a house drain or house sewer, excepting a main house trap will be permitted on the house drain, provided a vent pipe is taken from both sides of the trap, the same size as the house drain, and carried separately to the roof, and located as for roof outlets.

G. Other Waste Fixtures to Water Closet Trap Prohibited. In no case shall the waste from a bath tub or other fixture be connected with a water closet trap,

H. Overflow Connections. Overflow pipes from fixtures shall in each case be connected on the inlet side of the trap.

I. Cellar Drains. Cellar drains will be permitted only when they connect to a trap with a permanent water seal.

Sec. 25. Cleanouts. A. Size. Cleanouts shall be the same size as the pipe up to four (4) inches in diameter and not less than four (4) inches for larger pipe or traps.

B. Where Required: Cleanouts shall be provided as follows: At the foot of all vertical lines of soil pipe, and at the end of each horizontal line. The distance between the cleanouts shall not exceed fifty (50) feet.

There shall be at least two (2) four (4) inch cleanouts provided in the house drain; one made with a full size Y branch just inside of the wall near the house drain and the house sewer connection, and the second near the end of the house drain, or at the base of the soil or waste stack. Intermediate cleanouts may be made with Ts.

Any vertical soil, waste or vent pipe having an opening readily accessible from the roof and without change of direction in its entire length shall not be required to be provided with a cleanout other than at its base.

C. Manhole. All underground traps and cleanouts inside of a building, except where the cleanout traps are flush with the cellar floor, shall be made accessible by manholes with proper metallic covers, and all exterior underground traps with inacessible cleanouts shall also be placed in manholes.

D. Location. All traps and cleanouts shall be located so as to be easily accessible for cleaning.

TITLE V.

General Regulations.

Sec. 26. Grade of Horizontal Pipes. All horizontal piping shall be run in practical alignment and at a uniform grade of one-half (½) inch per foot when possible, but in no case shall the grade be less than one-quarter (¼) of an inch to one (1) foot for soil or waste pipes and house drains suspended by iron hangers upon piers or posts or wall ledges; and not less than one-eighth (⅛) of an inch per foot for vent or ventilating pipes, house sewers and underground drains.

Sec. 27. Change of Direction. All drainage and plumbing pipes shall be rigidly secured or supported to keep their alignment and grade, and all changes of direction, either horizontal or vertical, shall be made with the appropriate use of "Ys", half "Ys", sanitary "TYs", long sweep quarter, sixth, eighth or sixteenth bends, with short nipples where screw joints are used.

Increase or reduction in size shall be made by the use of a proper fitting.

Every vertical line of soil or waste pipe shall have no less than eighteen (18) inches of iron pipe run horizontally at its base.

Sec. 28. Prohibited Fittings. No double hub, double T, or sanitary T branches shall be used on horizontal runs, nor shall double hubs or straight crosses be used on the soil or waste pipe. Saddle hubs and bands are in all cases prohibited.

Sec. 29. Offsets in Mains. Offsets in the mains of all stacks shall be avoided if possible (except as prescribed under Title IX, section 63), but when unavoidable they shall, if possible, be made with forty-five (45) degree fittings.

Sec. 30. Dead Ends. In the installation of any plumbing systems, all dead ends in pipes shall be avoided.

Sec. 31. Drainage Excavation. All excavations required to be made for the installation of a house drainage system, or any part thereof, within the walls of a building, shall be open trench work. All such trenches shall be kept open until the piping has been inspected.

Sec. 32. Relieving Arches. Where pipes pass under walls the same shall be placed under openings, and in all cases where pipes pass under or through walls they shall be provided with a relieving arch or lintel.

Sec. 33. Stack Supports. All free standing stacks shall be thoroughly supported on concrete or masonry piers at their base, and those forty (40) feet or more in height shall also be provided with foot rests at their base and also with floor rests or supports at every ten (10) feet intervals.

The pipe supports according to their location shall be made either with heavy iron posts, hangers, wall brackets or steel fittings, concrete or masonry piers; provided that no brick pier shall be less than eight (8) inches square. The use of pipe hooks shall be prohibited for larger than one and one-half (1½) inch pipes.

TITLE VI.

House Sewerage and Drains.

Sec. 34. Independent Systems. The drainage and plumbing system of each new building or new work installed in an existing building shall be entirely separate and independent of that of any other building, except as provided in section 35; and wherever available every building shall have an independent connection with a public or private sewer.

Sec. 35. Exceptions Permissible. Where one building stands in the rear of another on an interior lot, and no private sewer is available, or can be made for the rear building, through an adjoining alley, court yard or driveway, the house drain from the front building may be extended to the rear building and the whole will be considered as one house drain.

Sec. 36. **Connections with Cesspools.** When a sewer is not available, drain pipes from buildings may be connected with cesspools or receiving vaults as prescribed in Title XVI. of this code; provided, however, that no water closet shall be connected to a leaching cesspool.

Sec. 37. **Old House Sewers and Drains.** Old house sewers and drains may be used in connection with new buildings or new plumbing, only when they are found on examination and test, to conform in all respects to the requirements governing new sewers or drains, as prescribed in this code. If the old work is found defective, the inspector shall notify the owner to make the necessary changes to conform with this code.

Sec. 38. **House Drains Underground.** All house drains shall, wherever possible, be brought into the building underground below the level of the basement or cellar floor.

Sec. 39. **Kind of Pipe.** All house drains shall be of extra heavy cast iron pipe, with well leaded and calked joints.

Sec. 40. **Drains to Curb.** Where there is no sewer accessible the drainage of surface inlets and rain water conductors shall be drained separately to the curb line where practicable by drain pipes not less than four (4) inches in diameter and discharge into the public gutter, unless otherwise permitted by the proper authority.

Sec. 41. **House Sewer.** The drain containing the house sewer, beginning three (3) to five (5) feet outside the building wall, shall consist of iron pipe (see Title I., Sec. 1) or of earthenware pipes, one (1) size larger.

They shall not be laid closer than three (3) feet to any exterior wall, cellar, basement, well or cistern, or less than two (2) feet deep. Change in direction shall be made with long curves, one eighth (⅛) bends or Ys.

TITLE VII.

Yard, Subsoil and Other Drains.

Sec. 42. **Drainage of Yards and Areas.** When yard and area drains are connected with the house drains each shall be effectively trapped; or, the various drains from the yards and areas may be connected together and be controlled by a single trap.

Traps shall be installed for drains which connect directly with a sewer intended to carry surface water.

Sec. 43. **Earthenware Yard Drains.** Barn, stable, yard and roof leader drains may be of earthenware and all such drains shall be trapped and connected with the house sewer at any convenient point.

No earthenware yard drain, or drains from kitchen sinks shall be less than four (4) inches.

Overflow pipes from cisterns shall not connect direct with any house sewer.

Sec. 44. **Subsoil Drains.** Where subsoil drains are placed under the cellar floor or used to encircle the outer walls of a building, the same shall be made of open jointed four (4) inch drain tile.

Open jointed drain tile shall be properly trapped before entering the house drain.

Sec. 45. **Back Pressure Valves.** Where a floor or open jointed drain tile is connected to a house sewer or drain each floor wash or connection shall be protected from back pressure by a gate or back pressure valve.

Sec. 46. **Exhaust, Blow-off, and Drip Pipe Connections.** The exhaust, blow-off, sediment or drip pipe from a steam boiler shall not connect directly with any sewer, drain, soil or waste pipe. Such pipes shall discharge into the top and above the line of discharge of a suitable closed tank or condenser made of wrought or cast iron, provided with a relief pipe, of at least three (3) inches in diameter, extending to the outer air above the roof.

The waste from said tank or condenser shall be taken from the bottom and be at least one size larger than the inlet, but not less than three (3) inches in diameter, and provided with a trap that has a seal of not less than twenty-four (24) inches and wherever possible shall connect to the house sewer and not to the house drain.

Sec. 47. **Hot Water Discharge Prohibited.** Water heated to over one hundred and forty (140) degrees Fahrenheit, shall not be allowed to enter any street sewer, drain or lateral.

When blow-off tanks discharge water at a higher temperature they shall be provided with a cooling device.

Sec. 48. **Elevator Connections.** All direct connected hydraulic elevators, lifts or pressure machines shall be provided with an intermediate tank of sufficient capacity so as to discharge its waste without pressure into any sewer, drain, soil or waste pipe. Such tanks shall be trapped and where there is danger of back pressure from the sewer there shall be placed on its outlet side a sewer or back water valve.

TITLE VIII.

Roof Conductors and Leaders.

Sec. 49. **Conductors not to Connect.** The metallic conductors or roof leaders or downspout wastes, and the surface and ground water drains, wherever possible, shall be connected with a sewer, but they shall not be connected to house sewers which discharge into sanitary sewers intended for the carriage of sewage only.

Sec. 50. **Inside Conductors and Roof Leaders.** When placed within the walls of any building or run in an inner court, or ventilating or pipe shaft, all conductors or roof leaders shall be constructed as prescribed for soil pipe.

Sec. 51. **Connections with Conductors Prohibited.** Conductor pipes shall not be used as soil, waste or vent pipes, nor shall any soil, waste or vent pipes be used as conductors.

Sec. 52. **Defective Conductor Pipes.** When an existing sheet metal conductor pipe within the walls of any building becomes defective such conductor shall be replaced by one which conforms to this code.

Sec. 53. **Outside Conductors.** When outside conductors or downspouts of sheet metal are connected with the house drain, they shall be so connected by the use of not less than one length of extra heavy cast iron pipe extending vertically at least four (4) feet above the grade line.

TITLE IX.

Soil, Waste and Vent Pipes.

Sec. 54. **Material Used.** All main and branch soil, waste, and vent and back vent pipes shall be of iron, lead, brass or copper.

Sec. 55. **Soil and Waste Pipe Stacks.** Every building in which water closets are installed shall have at least one four (4) inch soil pipe stack extending through the roof.

A three (3) inch soil stack may be used for the reception of wastes from one water closet and three small fixtures, or one water closet and slop sink, or two water closets, provided that there is one four (4) inch stack in the building and no part of the building in which the stack is placed shall be more than three (3) stories in height.

Sec. 56. Roof Extensions. All soil and waste pipes receiving the discharge of any fixture shall be extended the full calibre at least two (2) feet above the roof and at least five (5) feet when such roof is used for other purposes than weather covering the building.

In no case shall a vent pipe through the roof be less than four (4) inches in diameter.

Change in diameter shall be made by long increaser, at least one (1) foot below roof.

Sec. 57. Roof Joints. The joint at the roof shall be made water-tight by the use of proper sheet copper or lead plate, with a sleeve not less than six (6) inches long made to fit the pipe tightly. Where the face of the hub is flush with the roof and lead flashing is calked into the hub, a sleeve will not be required. Plate shall not be less than one foot six inches (1′ 6″) square.

Sec. 58. Terminals. The roof terminals of all vent pipes shall be at least three (3) feet above any door, window, scuttle or air shaft when located at distances less than twelve (12) feet from such terminal.

Sec. 59. Terminals Adjcining High Buildings. No soil, waste or vent pipe extension of any new or existing building shall be run or placed on the outside of a wall, but shall be carried up in the inside to the roof.

In the event that a new buliding is built higher than an existing building, the owner of the new building shall not locate windows within twelve (12) feet of any existing vent stack on the lower building, unless the owner of such new building shall defray the expense of, or shall himself make such alteration to conform with section 58 of this title.

It shall be the duty of the owner of the lower or existing building to make such alteration therein upon the receipt in advance of money or security therefor, sufficient for the purpose, from the owner of the new or higher building, or to permit at the election of the owner of the new or higher building the making of such alteration by the owner of said new or higher building.

Sec. 60. Prohibited Connections. In no case shall any fixture connection except water closet, pedestal urinal or trap standard slop sink be made to a lead bend. No vent pipe shall be used as a waste or soil pipe.

Sec. 61. Branch Soil and Waste Extensions. Any vertical branch rising more than ten (10) feet, or any lateral branch running more than twenty-five (25) feet from the main house drain, shall be continued full size to a point above the roof, or may be returned to the main, soil, or waste vent pipe full size.

Sec. 62. Vents; Length from Trap. For the purpose of obtaining a direct rising vent from a vertical waste line a fixture trap immediately under a small fixture waste shall be placed not more than twenty-four (24) inches from the vertical waste and vent line, measured between the center of the waste outlet of the fixture and the center of the waste and vent, provided that the point of entry into the vertical waste line is not lower than the bend of the trap.

For water closets, pedestal urinals, and trap standard slop sinks the distance allowed between the waste opening in the floor or wall and vent or back vent shall not be more than twenty-four (24) inches developed length.

Sec. 63. Main Vents. All main vents shall be run undiminished and connected full size at their base to the main waste or soil pipe at or below the lowest fixture branch and shall be extended above the roof. They may be connected with the adjoining soil or waste vent three (3) feet above the highest fixture opening, but this will not be permitted where there are fixtures on more than six (6) floors unless the size of pipe be increased in diameter to the combined area of the main, soil and waste vents to be served.

Sec. 64. Circuit, Loop and Continuous Vents. Every branch soil or waste pipe to which a group of two (2) and not more than eight (8) water closets, pedestal urinals or trap standard slop sinks are connected, may be vented by a circuit or loop vent, provided such horizontal branch does not exceed twenty-five (25) feet in length, and the fixtures are within the prescribed twenty-four (24) inch limit from the branch forming the circuit vent. Connections from such branch shall be taken from Y or TY branches. The vent shall be taken off in front of the last fixture connection, and must rise at an angle of forty-five (45) degrees to vertical to a point six (6) inches above the top of the highest fixture before offsetting horizontally or connecting to the branch, main, waste or soil vent.

Where fixtures discharge above such branch, each branch shall be provided with a relief vent one-half (½) the diameter of the soil or waste stack taken off in front of the first fixture connection and rise at an angle of forty-five (45) degrees to vertical to a point six (6) inches above the top of the highest fixture before being offset horizontally or connecting to the branch, main, waste or soil vent.

The main soil or waste stack shall be offset at every fourth story containing fixtures, immediately below the branch, soil or waste connection.

The soil and waste pipes shall conform to the sizes prescribed under Title I, Section 1.

The main vent pipe shall conform to, and the branch vent pipes shall be one full size larger than the sizes prescribed under Title I, Section 3.

Sec. 65. Branch Vent and Connections. All branch vent and back vent pipes shall be free from drops and sags and be so graded and connected as to drip back to the soil or waste pipe by gravity.

On horizontal runs such conections shall be taken off above the center lines as near the crown as possible and rise above such crown before being offset horizontally.

Horizontal vents below the water line of the fixture to be served shall be offset to vertical at the nearest partition and the vertical run shall not be connected less than six (6) inches above said fixtures.

Sec. 66. Common Vents for Fixtures. Where bath rooms, water closets or other fixtures are located on opposite sides of a wall or partition, or are directly adjacent to each other in an inseparable dwelling, such fixtures may have a common soil or waste pipe and vent pipe stack.

Sec. 67. Traps Back Vented. Every fixture trap shall be protected from siphonage and back pressure and air circulation assured by means of a vent or back vent pipe.

Sec. 68. Back Venting Water Closets. No earthenware fixtures with trap combined shall be provided with a back vent horn.

Every water closet, pedestal urinal and slop sink having a floor connection, shall be back vented from the soil or waste branch and preferably on the top of the branch. When connected with the vertical arm of a bend it shall be made above the top of the horizontal branch.

Sec. 69. Back Vents Not Required. A. Where two (2) water closets located on the same floor, discharge into a double sanitary T or TY in a soil or waste stack they need not be back vented if such fixtures do not exceed the three (3) foot limit without other fixtures above them.

B. When two fixtures other than water closets discharge into a double sanitary T or TY, and there are no other fixtures discharging above them said fixtures may be back vented through a common vent or back vent pipe.

C. No back vents shall be required on a back water trap or sub-soil catch basin trap.

D. The waste of a bath tub, basin, or sink may be connected to a Y or TY fitting between the closet bend and the stack without reventing the closet bend providing there are no other fixtures discharging above.

E. Cellar floor drains connecting to the house drain in front of a soil or waste stack and provided with a trap that has a water seal of not less than three (3) inches, or discharges into the inlet side of a downspout trap, need not be back vented.

Sec. 70. Location of Fixtures. No trapped plumbing fixtures shall be located in any room or apartment which does not contain a window placed in an external wall of the building or is not provided with a system of ventilation.

Compartments containing not more than four (4) water closets or their equivalent shall be located in an apartment containing windows placed in the external wall of the building or shall be provided with a mechanical system of ventilation which will change the air at normal temperature at least six (6) times per hour.

Compartments containing more than four water closets or their equivalent shall be located either in an apartment containing windows and provided with a gravity or mechanical system of ventilation which will change the air at normal temperature not less than six (6) times per hour, or may be placed in a compartment without windows in the external wall of the building, providing a mechanical system of ventilation is installed which will change the air at normal temperature not less than six (6) times per hour.

Ventilation from toilet rooms shall be separate and distinct and have no connection whatever with the other ventilating ducts in the building.

TITLE X.

Refrigerator, Safe and Special Wastes.

Sec. 71. Refrigerator, Safe and Special Wastes. No plumbing fixtures except a bar sink, dental or fountain cuspidor, soda fountain, or drinking fountain shall be installed with an indirect waste connection to the plumbing and drainage system. The waste of every bar sink, dental or fountain cuspidor, soda fountain, and drinking fountain, if not directly connected, shall discharge over a properly water supplied, trapped, and vented sink, or may discharge into a cellar floor drain. The size of the waste pipe shall conform to the table in Title I, Section 1. Each fixture opening shall be separately trapped.

No back vents shall be required, but when fixtures have a common waste pipe and are located on or above the second floor, the waste pipe shall be extended through the roof.

Floor drains, safe, refrigerator, and ice box waste pipes shall be installed with an indirect connection to the plumbing and drainage system. They shall discharge over a properly water supplied, trapped and vented sink, publicly placed, not more than four (4) feet above the floor, or may discharge into a cellar floor drain. In no case shall any refrigerator or safe waste pipe discharge over a sink located in a room used for living purposes. Each fixture opening shall be separately trapped.

In apartments, flats, lodging and tenement houses where the refrigerator wastes extend through two (2) or more stories, the waste line shall extend through the roof.

The branches or vertical lines shall be made by Y or TY fittings and cleanouts provided to control the horizontal part of the waste pipe.

Sec. 72. Overflow Pipes. The overflow pipes from a water supply tank shall not be directly connected with any drain, soil or waste pipe. Such pipe shall discharge upon the roof or be trapped into an open fixture and discharge.

Sec. 73. Urinal Safes. Urinal platforms and safes shall not be directly connected with any drain, soil or waste pipe, except when used in combination with a urinal floor gutter.

The outlet of such gutter shall be provided with a brass strainer with arrangements for flushing the same while in use.

If such safe waste also serves as a floor waste outlet the trap shall be at least three (3) inches in diameter.

Sec. 74. Kitchen Wastes. Kitchen or other greasy wastes from hotels, restaurants, club houses, public institutions or other establishments in which much cooking is done or greasy wastes obtain, shall be intercepted by a catch basin or a grease trap, and then conducted to the house sewer.

Sec. 75. Stable and Garage Wastes. All liquid wastes from barns, garrages, stables, manure pits and stable yards shall be intercepted before entering the sewer by a suitable catch basin, properly trapped. Said catch basin shall be provided with a vent not less than four (4) inches continued through the roof.

TITLE XI.

Fixtures.

Sec. 76. Materials. All receptacles used for water closets, urinals or otherwise for the disposal of human excreta, shall be either vitrified earthenware, hard natural stone or cast iron white porcelain enameled on inside. If cast iron is used, it shall be enameled or painted on the outside with at least three (3) coats of non-absorbent and non-corrosive paint.

Sec. 77. Water Closet Bowls. The bowls and traps for water closets shall be made in one piece and of such shape and form as to hold a sufficient quantity of water when filled up to the trap overflow so as to completely submerge any matter deposited in them and properly flush and scour the soil pipe when the contents of the bowl are discharged, except that nothing in this section shall apply to latrine closets.

Sec. 78. Visible Trap Seal. All water closets, pedestal urinals or slop sinks with trap combined, shall have visible trap seals.

Sec. 79. Flushing Rims. All water closets, or pedestal urinals shall be provided with flushing rims, constructed so as to flush the entire interior surface of the bowl thereof with water as prescribed in a subsequent section of this rule.

Sec. 80. Open Plumbing. All plumbing fixtures shall be installed or set free and open from all enclosing work.

All pipes from fixtures shall be run to the wall. This does not include water closets, pedestal urinals, or trap standard slop sinks.

Sec. 81. Low Down Closets. Water closets with low down tanks shall be of siphon pattern, provided with re-filing devices.

Sec. 82. Water Closets Prohibited. Pan, valve, plunger, offset, washout, and other water closets except latrines having invisible seals or an unventilated space, or the walls of which are not thoroughly washed at each discharge are prohibited.

Long hopper water closets and similar appliances shall not hereafter be installed, except as provided in Section 87.

The provisions of this section shall also apply to the dry closet system or other system of closets in which the venting, back venting or local venting is to be made otherwise than in this code prescribed.

Sec. 83. Urinals. All urinals, troughs or gutters other than those heretofore prescribed, shall be constructed of materials impervious to moisture and that will not corrode under the action of urine. When floor gutters are used as urinals the gutters shall be made with Portland cement or other impervious material and the floor and walls within five (5) feet of such gutter shall be made equally water tight and impervious. In districts having no sewer connections copper or galvanized iron urinal troughs may be used in outhouses, sheds, barns and in yards and at least twenty (20) feet distant from any building of a better grade.

Sec. 84. Wooden Trays and Sinks. Fixed wooden wash trays or sinks are prohibited in any building or part of building designed or used for human habitation.

Sec. 85. Bath Tubs. No new copper lined wooden bath tubs shall be installed, nor shall any old fixture of this class be reconnected. Any defective bath tub condemned by the proper authorities shall be removed.

Sec. 86. Latrines and Range Closets. Latrine or range water closets shall be made of cast iron with all interior surface white porcelain enameled and all other surfaces coated with non-corrosive paint; or, latrines or range closets may be of vitreous earthenware thoroughly glazed.

Latrines or range closets shall have flushing rims or other means of adequately flushing the front and rear inside surfaces constantly or at intervals. If pipes are used for such purposes they shall be made of brass.

Latrines or range closets shall be provided with automatic dumping tanks which shall discharge at intervals of not more than ten (10) minutes, and supply to each single latrine or range closet not less than ten (10) gallons of water at each discharge. The entire volume of water shall be delivered at once at one end of the latrine or range closet, passing over the entire length of the same and discharging at the other end through the sewer trap. Latrines in school buildings shall be flushed at least every three minutes during recess periods.

The bottom of latrines or range closets shall have a depression under the center of each seat, that shall retain a body of water at least one and one-half (1½) inches deep over an area of six (6) inches in diameter, gradually diminishing in all directions so that the surface of the water retained shall not be less than sixty (60) square inches.

There shall be an opening back of each seat of not less than ten (10) square inches of area, covered by a screen of non-corroding material.

The local vent duct within four (4) feet of the floor line shall be of not less than No. 27 copper, with riveted and soldered joints, shall be graduated in size in proportion to the fixtures added, and shall be installed in such a manner as to be self-draining.

Where electric current or water pressure is available, local vent ducts shall be connected to a ventilating flue provided with an electric or hydraulic exhaust fan of such capacity or size as to create sufficient draught to carry off all offensive odors. Where electric current or water pressure is not available, ventilating flues with stack heaters, shall be provided.

Covers shall be so attached that all interior surfaces of the latrines and range closets can be exposed to view.

No latrine or range closet shall have more than eight (8) compartments and each latrine or range closet shall have a separate trap not less than six (6) inches with a four (4) inch cleanout which shall be back vented by a four inch pipe.

There shall be an iron top for each latrine or range closet section porcelain coated on the under side and each iron top shall be covered by a square oak seat and lid properly re-enforced.

Wood seats shall be thoroughly painted on the bottom and be varnished throughout; put together with brass hinges, cast iron braces and brackets to make them closed when not held up, and so equipped that they cannot be tampered with and can be easily opened for cleaning.

Latrines and range closets shall be substantially supported and be graduated for the proper fall towards the outlet.

Sec. 87. Frost Proof Closets; Where Permissible. Frost proof closets may only be installed in compartments which have no direct connection with any building used for human habitation or occupancy. The soil pipe between the hopper and the trap shall be not less than three (3) inches in diameter, and shall be either lead or cast iron.

Sec. 88. Water Supply to Fixtures. All water closets, urinals or other plumbing fixtures shall be provided with a sufficient supply of water for flushing, to keep them in a proper and sanitary condition.

Sec. 89. Water Closet Supply. No water closet or urinal bowl shall be supplied directly from the water supply pipes, excepting anti-freezing closets, or by an improved flushometer valve. Every water closet or urinal bowl shall be indirectly flushed through a flushing tank of at least four (4) gallons capacity for each water closet and two (2) gallons for each urinal. The tank shall be properly supplied with water and the flush pipe to the water closet or urinal shall be at least one and one-quarter (1¼) inches in diameter, except for outside hoppers and urinals.

Sec. 90. Flushing Tanks; Groups of Fixtures. A group of urinals, on the same floor, subject to constant use as in schools and factories may be supplied from one (1) tank, if provided with an automatic simultaneous flush provided that each individual urinal shall receive not less than one (1) gallon of water at each flushing and the discharge is of such force as to cleanse such individual bowl at each flush.

Sec. 91. Automatic Flushing Tanks. All urinals having either intermittent or automatic flushing devices shall be flushed at regular intervals not to exceed ten (10) minutes each during the hours that such fixtures are in use.

The backs of gutter stalls to the height of three and one-half (3½) feet shall be kept constantly moist with a proportionate supply of water while in use.

Sec. 92. Urinal Trough and Gutters. Urinal troughs and gutters shall be flushed either by an automatic flushing tank the same as required for individual urinals, or may be flushed by a direct water supply through a brass pipe carried the full length of the trough, perforated every two (2) inches.

Sec. 93. Flushing Tanks. All valves of flushing tanks shall be so fitted and adjusted as to prevent the waste of water. The water from flushing tanks shall be used for no other purposes.

TITLE XII.

Toilet Rooms.

Sec. 94. Toilet Room Floors. All floors in toilet rooms, lavatories, water closet compartments, or any other enclosure where plumbing fixtures are used within the building, shall have a waterproof floor and base made of non-absorbent indestructible water-proof material, viz., asphalt, glass, marble, Portland cement, vitrified or glazed tile or terrazzo or monolithic composition.

The base shall not be less than six (6) inches high and shall have a sanitary cove at the floor level.

Exceptions. In apartments, flats, tenements and dwellings, where water closets are used in common by two or more families, a water closet may be set on a marble, stone or slate not less than seven eighths (⅞) inches thick, extending from the wall to a point one (1) foot in front of the base of the closet and not less than twenty-four (24) inches in width. In apartments, flats, tenements and dwellings where a toilet room is provided for each family, water closets may be set directly on a wood floor.

Sec. 95. Sound Proof Partitions. Where toilet rooms for males and females are adjacent to each other, they shall be separated by sound-proof partitions extending to the ceiling and the entrances shall be screened and the traveling distance between them shall not be less than twenty (20) feet.

Sec. 96. Toilet Rooms; Doors and Covering. In all buildings the outside partition of any water closet or urinal apartment shall be solid and extend to the ceiling or be independently ceiled over. When necessary to light such apartments the upper part of the partitions shall be provided with translucent glass. The interior partitions of such apartments shall be dwarf partitions.

All urinals, urinal troughs or gutters shall be divided into stalls not less than eighteen (18) inches wide by partitions not less than four feet six inches (4′ 6″) high measuring from floor line and nine (9) inches wide, raised not less than one (1) foot above the floor.

No room containing water closets or urinals shall be less than seven feet high.

TITLE XIII.

Inspection and Tests.

Sec. 97. Nature of Tests. All piping of a drainage or plumbing system shall be given two (2) tests by the plumber in charge; first the roughing-in with water, smoke or air test; second and final with smoke in the presence of the proper authorities.

Sec. 98. Material and Order of Test. The material and labor for the tests shall be furnished by the plumber.

The tests shall be made in the following order: 1st, the house drain; 2nd, the soil and waste vents and all vertical piping; 3rd. the final on the whole system. The first and second tests may be combined.

Sec. 99. House Drain. The house drain shall be tested with water, smoke or air test. The water test shall have a ten (10) foot head of water and the smoke and air test a five (5) pound pressure. All alterations, repairs or extensions which shall include more than ten (10) feet, shall be inspected and tested.

Sec. 100. Stable, Garage and Yard Drains. For a stable, garage, or any part of a stable the same tests and inspection of the plumbing and drainage system thereof shall be made as in the case of an ordinary dwelling.

Sec. 101. Conductor Pipes. Conductor pipes and their roof connections within the walls of buildings, or conductor branches on the outside system where such branches connect with the house drain or are less than three (3) feet from the wall of the building shall be tested by the water test.

Conductor branches on the outside system may be tested with the house drain as in section 99.

Sec. 102. Covering of Work. No part of any plumbing or drainage system shall be covered until it has been inspected, tested and approved.

Sec. 103. Fixtures; Final Test. When a plumbing drainage system is completed and the water is turned on and the traps filled, it shall be inspected and tested. When the location or style of any fixture is changed it shall be inspected.

Sec. 104. Water and Air Test. Soil, waste, vent and inside conductor pipe stacks, and all work known as "rough" work between the house drain connections to points above the finished floors and beyond the finished face of walls and partitions, shall be tested with the water, air or smoke test when the whole stack is completed and topped out above the roof.

The water test shall be applied by closing the opening at the outlet end of the house drain and all openings in the piping with proper testing plugs to the highest opening above the roof, and completely filling the system with water; the water columns to be left standing at least fifteen (15) minutes; if the water level remains constant such time the system shall have been acceptably tested.

When water is not available or when there is danger of freezing the air or smoke test shall be used with a pressure of five (5) pounds, using an open mercury gauge with ten (10) inches of mercury.

Sec. 105. Smoke Test. The drainage system of all new buildings and all new soil, waste or vent stacks hereafter installed in existing buildings shall be given their final test with smoke.

The smoke machine shall be connected to any suitable opening or outlet in the system, and when the system is completely filled with dense pungent smoke, and the openings emit smoke they shall be closed and an air pressure equivalent to one (1) inch water column shall be applied and left standing at least ten (10) minutes. If there is no leakage or forcing of trap seals, the system shall be deemed air or gas tight. But nothing in this section shall be so construed as to prevent the removal of any cleanout, or unsealing of traps to ascertain if the smoke has reached all parts of the system.

Sec. 106. Smoke Test Imperative. The smoke test shall be used in testing the sanitary condition of the drainage or plumbing system of all buildings, where there is reason to believe that the plumbing system has become dangerous or defective on account of settling of the buildings or by abuse, accident or other cause.

Sec. 107. Defective Work. If tests show defects the defective work or material shall be replaced within three (3) days and the tests again applied. In all cases the inspector shall designate the points at which the pressure shall be relieved or drawn off.

Sec. 108. Repairs. Tests shall not be required after repairing or replacing any old fixture, faucet or valve by a new one, to be used for the same purpose; forcing out stoppage, repairing leaks, or relieving frozen pipes and fittings; but such repairs or alterations shall not be construed to include cases where new vertical or horizontal lines of soil, waste, vent or interior leader or condutor pipes are used or their relative locations changed; provided, that, in a building condemned by the proper authorities because of the insanitary condition of the house drainage or plumbing, no such drainage or plumbing shall be considered as coming under the head of repairs, but all such house drainage or plumbing shall be installed as provided for in new buildings.

Sec. 109. Tests Not Required. No tests or inspections shall be required where a house drainage and plumbing system or part thereof is set up for exhibition purposes, nor shall the final test be required where the plumbing is placed in an outhouse, stable or detached building used exclusively for that purpose.

TITLE XIV.

Catch Basins.

Sec. 110. Yard Catch Basins. Yard catch basins which receive surface drainage or the discharge from hydrants or waste pipes shall not be less than twelve (12) inches in diameter and have not less than a four (4) inch trapped outlet for cleaning, placed below the frost line. Where the inlet is liable to injury, the same shall be provided with a heavy cast iron frame and strainer set flush with the grade.

Sec. 111. Subsoil Catch Basins. Subsoil catch basins, located where the water fluctuation is such that a constant water seal on the trap outlet is not maintained, shall be located outside the walls of the building, provided with a ball cock attached to the water supply pipe for the maintenance of such seal. The trapped outlet for such catch basin shall be formed by turning a four (4) inch bend or invert down into the water of the basin to within six (6) inches of the bottom.

Sec. 112. Kitchen Catch Basins. Catch basins for receiving kitchen wastes, shall be constructed water-tight, either of brick, concrete, tile or cast iron. If of brick, tile or concrete they shall be at least twenty (20) inches internal diameter, and be finished with a stone or iron cover.

Sec. 113. Kitchen Catch Basins; Inverts and Traps. The bottom of the catch basin shall be at least two (2) feet below the four (4) inch invert of the outlet to the sewer.

The outlets shall be trapped to a depth of twelve (12) inches below the invert of the outlet to the sewer to prevent the escape of grease, by a hood or trap of brick and cement mortar or a hood of concrete or cast iron.

The invert of the inlet to the catch basin, for kitchen wastes, shall not be less than two and one-half (2½) feet above the finished bottom of the catch basin.

TITLE XV.

Sumps and Ejectors.

Sec. 114. Drainage Below Sewer Level. In all buildings in which the whole or part of the house drainage and plumbing system thereof lies below the crown level of the main sewer, sewage or house wastes shall be lifted by artificial means and discharged into the house sewer.

Sec. 115. Sumps and Receiving Tanks. All subhouse drains shall discharge into a perfectly air tight sump or receiving tank so located as to receive the sewage by gravity, from which sump or receiving tank the sewage shall be lifted and discharged into the house sewer by pumps, ejectors or any equally efficient method.

Such sumps shall be either automatically discharged or be of sufficient capacity to receive the house sewage and wastes for not less than twenty-four (24) hours.

Sec. 116. Ejectors Vented. The soil or waste pipe leading to an ejector or other appliance for raising sewage or other waste matter to the street sewer, shall, where a water closet or closets are installed, be provided with a soil or vent pipe not less than four (4) inches in diameter, and where fixtures other than water closets are installed the vent pipes shall be the same diameter as the waste pipe.

Sec. 117. Motors, Compressors, Etc. All motors, air compressors and air tanks shall be located where they are open for inspection and repair at all times. The air tanks shall be so proportioned as to be of equal cubical capacity as the ejectors connected therewith, in which there shall be maintained an air pressure of not less than two (2) pounds for each foot of height the sewage is to be raised.

Sec. 118. Ejectors for Subsoil Drainage. When subsoil catch basins are installed below the sewer level automatic water ejectors provided with a ball float attached to the main water supply shall be used.

Such ejectors or any device raising subsoil water shall discharge into a properly trapped fixture.

TITLE XVI.

CESSPOOLS.

Sec. 119. Cesspools Permitted. Tight or leaching cesspools may be used to receive sewage or other domestic wastes only when written permission to that effect has been secured from the local board of health of the municipality in which the same is constructed, if in a municipality, and if not then from the Ohio State Board of Health, and such permission can be given only when a public sewerage system is not available.

Sec. 120. Cesspools Prohibited. No cesspool for sewage shall be constructed where a sewer is available, nor shall any connection from such cesspool be made with any sewer.

Cesspools now existing in premises accessible to a sewer, and cesspools that may hereafter become accessible to a sewer shall be discontinued, emptied of their contents, cleaned out and be filled with earth or ashes and the house sewer shall be disconnected from the old cesspool and be reconnected with the public sewer.

Sec. 121. Sewage Cesspools. Where a public sewer is not available, and written authority has been secured from the proper board of health (see section 119) to construct such cesspool and there is sufficient area for the purpose, a water tight cesspool may be used to receive sewage or other domestic wastes, which may be overflowed to a leaching cesspool, providing there is no danger of contaminating a water supply, well, or spring, and the soil is of absorbent character. Otherwise a tight cesspool only shall be used, or sewage treatment works shall be constructed.

Sec. 122. Tight Cesspools. A water-tight cesspool for drainage shall not be less than six (6) feet in diameter by ten (10) feet deep in clear, or equivalent, built of cast iron, vitrified brick, eight (8) inches thick laid in Portland cement mortar; or Portland cement concrete eight (8) inches thick, and made water-tight and maintained so.

Sec. 123. Leaching Cesspools. A leaching cesspool shall not be less than the dimensions of the water-tight cesspool, lined with brick or stone, without mortar.

Sec. 124. Ring and cover. Tight and leaching cesspools shall be provided with a twenty (20) inch cast iron ring and cover.

Sec. 125. Location of Cesspools. No tight cesspool shall be placed within two (2) feet of any lot line or twenty (20) feet of any building or water-tight cistern or thirty feet from any well, spring or other source of water supply used for drinking or culinary purposes.

No leaching cesspool shall be placed within one hundred (100) feet of any dwelling or water-tight cistern, or within three hundred (300) feet of the source of any water supply.

Sec. 126. Cesspool Vents. Tight cesspools shall be vented with four (4) inch vent pipe extending not less than ten (10) feet above the ground and not less than twenty (20) feet from any window, door or other opening in buildings used for human habitation.

Sec. 127. Piping. The inlet and outlet of the tight cesspool shall be submerged at least one (1) foot below the flow line and shall be of the same size as the house sewer. The piping between the tight and leaching cesspool may be either of vitrified sewer pipe or cast iron.

TITLE XVII.

SEWAGE TREATMENT WORKS.

Sec. 128. Permission to Construct and Use. Sewage treatment works shall be constructed only after the site has been inspected and the site, plans, and specifications for the construction of the same have been approved by the Ohio State Board of Health, and no such works shall be used to receive sewage or other domestic wastes until after the construction and equipment of the same have been completed in accordance with plans approved by the Ohio State Board of Health.

TITLE XVIII.

VAULTS.

Sec. 129. Privy Vaults Permitted. Privy vaults may be constructed only on premises where water and sewers are not accessible.

Sec. 130. Privy Vaults Prohibited. Privy vaults shall not be constructed where a sewerage system is available, nor on any lot where in cleaning, the night soil would have to be carried through any building of human habitation, nor shall any old vault be connected to a sewer.

Vaults now existing on premises accessible to a sewer shall be cleaned to the bottom and filled with ashes or earth.

Sec. 131. Location of Vault. No vault, manure pit, open top cesspool, septic tank or other reservoir which is used as a privy or receptacle for human or animal excreta shall be located within two (2) feet of any lot or alley line or twenty (20) feet of any street line or any building of human habitation or occupancy or within fifty (50) feet of any cistern, well, spring or other source of water supply used for drinking or culinary purposes, whether they are located on the same or an adjoining lot, or premises.

> EXCEPTIONS. No privy vault shall be located within fifty (50) feet of any school building.

Sec. 132. Construction of Vaults. All vaults, pits or other open top reservoirs described in section 131 shall be made of either brick or concrete. The walls of such vaults, if made of brick shall be of hard burned sewer brick, not less than eight (8) inches thick, laid in Portland cement mortar and the walls plastered outside and inside with a half (½) inch coat of Portland cement mortar, in proportion of one part of Portland cement and two parts of clean, sharp sand. After this coating is put on it shall be given one coat wash of liquid Portland cement. The bottom shall be at last three (3) brick course laid in cement mortar, or of Portland cement concrete mortar eight (8) inches thick.

When Portland cement concrete is used to construct vaults, the walls shall be at least six (6) inches thick, laid to a form, and the concrete shall be made of one part of live Portland cement, three parts of clean, sharp sand, five parts crushed stone, free from dust and of sizes between one-quarter (¼) and one and one-half (1½) inches in largest diameter, and shall be plastered and grouted inside and out as prescribed above for brick construction.

Vaults shall be made tight and their walls continued twelve (12) inches above the ground surface to prevent surface drainage. No retempered cement shall be used.

If the vault is used in connection with an out-house the vault shall be of such shape and size as not to extend under any portion of the floor of the said outhouse but only under the space occupied by the seats. Any portion of the vault extending beyond the walls of the outhouse shall be covered by a four (4) inch brick arch, four (4) inch stone flagging, reinforced concrete slab or cast iron.

Sec. 133. Outhouses. Over each privy vault, which shall receive nothing but human excreta, there shall be placed an outhouse constructed as prescribed in Title XII, section 96.

The seats shall be provided with self-closing tight fitting covers, and the space underneath shall be ventilated by a vent pipe or box extending upward through and three (3) feet above the roof. Such vent pipe shall be at least six (6) inches square for every square yard or part thereof of vault surface.

Sec. 134. Cleanout Doors. Vaults shall be provided with a cleanout extension not less than two (2) by one and one-half (1½) feet in size, connecting directly with the vault.

The cleanout opening shall be provided with a trap door the full size of the cleanout. The cleanout extension shall extend at least one (1) foot above the grade line.

Sec. 135. Floors. Floors of outhouses shall be made tight.

Sec. 136. Outhouses for Different Sexes. Where outhouses are provided for the different sexes, if located within forty (40) feet of each other, the walks or approaches thereto shall be separated by a tight fence, at least six (6) feet high, but in no case shall such outhouses be located within ten (10) feet of each other.

TITLE XIX.

PUMPS AND HYDRANTS.

Sec. 137. Pumps and Hydrants. Pumps and hydrants shall be placed in the center of a concrete or cement platform not less than six (6) feet in diameter.

The platform shall be placed six (6) inches above the natural grade line, and be graded up around the same to within two (2) inches of the top of the platform and in such a manner as to run all surface water away from the pump or hydrant.

Pumps and hydrants shall be provided with concrete or cement gutters or sewer pipe drains which will carry away all waste water and discharge same at a point not less than twenty (20) feet distant from the pump or hydrant.

Adopted July 23, 1913.

Oscar Hasencamp, M. D.,
President.

Attest:

E. F. McCampbell, Ph. D., M. D.,
Secretary.

The Secretary presented a list of health officers, appointed by their respective councils to serve in lieu of a board of health.

It was moved by Mr. Hill and seconded by Dr. Grube to approve these health officers.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented rules and regulations adopted by the health officer of Waynesburg, these rules being those recommended by the State Board of Health.

It was moved by Mr. Hill and seconded by Dr. Brown to approve these rules and regulations.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the application of Dr. F. A. S. Kautz for a renewal of his license to conduct a maternity boarding house and lying-in hospital at 2839 Clifton Avenue, Cincinnati, providing for the care of four women and four children.

It was moved by Mr. Hill and seconded by Dr. Miller to grant a renewal of this license.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented communications which he had received relative to the Board's action, refusing to renew the license of Lida M. owers to conduct a maternity boarding house and lying-in hospital in Toledo, and requests for reconsideration of the matter.

The Board refused to reconsider this matter.

The Secretary brought up the question of delegates to the Fourth International Congress on School Hygiene to be held in Buffalo, N. Y., August 25-30, 1913; and stated that it would be impossible to get together a suitable exhibit by that time.

It was moved by Dr. Grude and seconded by Dr. Miller that the President, Secretary and Dr. H. C. Brown be appointed delegates to this meeting.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the following memorial, which had been prepared by Dr. Josiah Hartzell, member of the Board:

MEMORIAL.

Having learned of the sudden death, at Millersburg, Ohio, on Tuesday, July 22, 1913, of Dr. Simon P. Wise, a former member of this Board, it is deemed most fitting that honorable note should be taken in his memory.

Dr. Wise was a pioneer in the cause of sanitation in our state. During his term as member of the Ohio State Board of Health his co-operation with every effort to improve sanitary conditions and prevent disease, was very effective. His services in behalf of the welfare of his fellow citizens were of the highest value and merit the grateful mention of the Board.

It is the unanimous wish of the Ohio State Board of Health, in regular meeting assembled, that this testimony of honor to the memory of Dr. Wise be recorded in the minutes of the Board. Also that a properly prepared copy of same be sent to the surviving members of his family.

There being no further business, the board adjourned.

Attest: E. F. McCamrbell, M. D.,
Secretary.

Approved September 2, 1913.

SEPTEMBER MEETING
1913

A regular meeting of the State Board of Health was held at "The Breakers," Cedar Point, Tuesday, September 2, 1913, at 8 P. M.

There were present Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

The Secretary read a letter, under date of July 24, 1913, citing the city of Columbus, by its officers or others, to appear and show cause, if any exists, why the city should not be required to cease polluting the waters of the Scioto River and Alum Creek by the discharge of untreated sewage into said streams.

In response, there appeared Mr. Jerry O'Shaughnessy, superintendent of the Division of Sewage and Water, and Mr. C. B. Hoover, chemist in charge of the Division of Sewage Disposal, representing the director of public service.

The chief engineer, Mr. Dittoe, made a statement in regard to the investigation that had been made of the pollution of the Scioto River and Alum Creek, and the investigation of the equipment of the sewage pumping plants and treatment works, saying that in his judgment it would be necessary for the city to provide sufficient equipment to take care of the sewage; to enlarge the sewage pumping plants, and to give attention to the intercepting sewer connections.

Mr. Hill stated that he had received complaints from citizens of Columbus living in the vicinity of the sewage treatment plant, and that he deemed it necessary that some immediate action be taken by the city.

Mr. O'Shaughnessy and Mr. Hoover explained that in their official capacity they were doing everything possible with the present equipment to take care of the sewage of the city, and that it would be necessary to enlarge the equipment considerably. They further stated that the city council had been asked for funds to properly operate the sewage treatment works and pumping plants but that such funds had not been appropriated.

The matter was referred to executive session.

The Secretary read the letter under date of July 24, 1913, citing the authorities of Akron to appear and show cause, if any exists, why the city should not be required to install sewage treatment works prior to June 1, 1915.

In response to this notice of a hearing there appeared Mr. R. L. Kryder, assistant city solicitor of the city of Akron, who stated that the city realized that the Little Cuyahoga River was being polluted by sewage and other wastes from the city, and that the city of Akron would not protest against the State Board of Health issuing an order requiring removal of such pollution.

This matter was referred to executive session.

The President called for a representative of the county commissioners of Franklin County in reference to the pollution of Alum Creek by sewage from the Franklin County Infirmary. There was no response.

This matter was referred to executive session.

The Secretary read the letter under date of July 24, 1913, citing the authorities of Chardon to appear and show cause, if any exists, why the village should not be required to install sewerage and sewage treatment works prior to January 1, 1915.

In response to this notice of hearing there appeared Mr. R. S. Parks, village solicitor, Mr. W. W. Hall, mayor and Mr. J. H. Cheney, president of council, who stated that the village would not protest against the State Board of Health issuing such an order.

This matter was referred to executive session.

The Board then went into executive session.

It was moved by Dr. Brown and seconded by Dr. Miller to approve the minutes of the last meeting of the Board (July 23, 1913).

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Mr. Hill to approve the monthly report of the Secretary which included the following:

The appointment of Miss Margaret Kepler as clerk in the Division of Tuberculosis, at a salary of $60.00 per month. (After serving one month, Miss Kepler resigned and her resignation was accepted.)

The appointment of Mrs. Ila Mizer as stenographer at a salary of $50.00 per month.

The acceptance of the resignation of Miss Margaret Huffman as stenographer.

The appointment of Miss Edna L. Moorhead as stenographer in the Division of Tuberculosis, at a salary of $60.00 per month.

The appointment of Miss Mabel Baldwin as extra clerk, at a salary of $50.00 per month, to take the place of Miss Helen O'Connor who was promoted to the position of general clerk at the May 22, 1913, special meeting.

The purchase of the following books:

"Transactions of the Second Triennial Meeting of the National Association for the Study of Pellagra."

"Epidemic Infantile Paralysis." $2.75 net.

It was moved by Dr. Miller and seconded by Dr. Brown to approve the financial report, this being a statement of the expenditures from

July 15th, to and including August 31, 1913, and a statement of balances available on September 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Board then took up the question of the pollution of the Little Cuyahoga River by the sewage and other wastes from the city of Akron. An opportunity having been given the city of Akron, through and by its officials, to be heard, and no good cause having been urged or protest made why the city should not be required to install sewage treatment works, it was moved by Dr. Grube and seconded by Dr. Miller that the report of the chief engineer be now approved and confirmed, and that the Board adopt the following order:

> "*Be it ordered by the State Board of Health of the State of Ohio,* That the city of Akron install and have in operation prior to June 1, 1915, sewage treatment works to correct the conditions as set forth in a petition of the board of commissioners of Summit County, received by the State Board of Health June 26, 1913, and as found and determined by the State Board of Health from an investigation of July 11, 1913."

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was thereupon moved by Dr. Grube and seconded by Dr. Miller that the findings and order of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board then took up the question of the pollution of Alum Creek by the sewage and other wastes from the Franklin County Infirmary.

The board of county commissioners having been given an opportunity to be heard, and having failed to appear or to show cause why the county commissioners should not be required to install sewage treatment works to treat the sewage from the Franklin County Infirmary, it was moved by Mr. Hill and seconded by Dr. Miller that the report of the chief engineer be now approved and confirmed, and that the Board adopt the following order:

> "*Be it ordered by the State Board of Health of the State of Ohio,* That the board of commissioners of Franklin County install and have in operation prior to July 1, 1914, sewage treatment works to correct the conditions set forth in a petition of the trustees of Marion Township, Franklin County, received by the State Board of Health June 5, 1913, and as found and determined by the State Board of Health from an investigation made July 14, 1913."

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube Hill, Sutton, Miller and Brown. Nays, none.

It was thereupon moved by Mr. Hill and seconded by Dr. Miller that the findings and order of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board then took up the question of the pollution, by the village of Chardon, of Bass Lake inlet, a small tributary to the Chagrin River.

The village of Chardon having been given an opportunity to be heard through its officials, and said officials having stated in the presence of the Board that no protest would be made against the requirement that sewerage and sewage treatment works be installed, it was moved by Mr. Hill and seconded by Dr. Brown that the report of the Board's chief engineer be now approved and confirmed; and that the Board adopt the following order:

> "*Be it ordered by the State Board of Health of the State of Ohio,* That the village of Chardon install and have in operation prior to January 1, 1915, a system of sewerage and a sewage treatment plant to correct the conditions set forth in a resolution of the village council received by the State Board of Health May 3, 1913, and in a petition of the trustees of Munson Township, Geauga County, received by the State Board of Health June 26, 1913, and as found and determined by the State Board of Health from an investigation of May 28, 1913."

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs, Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was thereupon moved by Mr. Hill and seconded by Dr. Brown that the findings and order of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board took up the question of the pollution of the Scioto River and Alum Creek by the sewage of Columbus, and Dr. Brown presented the following resolution, moving its adoption:

> "*Be it resolved,* That the sewage pumping and treatment facilities of the city of Columbus, Ohio, are not adequate to properly serve the purpose for which these works were intended; that sufficient funds should be provided to maintain the operation of the present works throughout the year; and that the city of Columbus, Ohio, should provide sufficient funds to install the additional pumping and treatment equipment which is needed."

This motion was seconded by Mr. Hill and adopted.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

Mr. Hill presented his report as engineering committee, and the matters were taken up in the following order:

It was moved by Dr. Miller and seconded by Dr. Brown to approve a proposed water supply for Magnolia (request for approval of which was recived July 28, 1913, from Mr. W. L. Hime, mayor of the village) developed according to plans received from Mr. L. E. Chapin, consulting engineer, November 14, 1912, subject to the following conditions:

1st. That a process for the removal of the excessive iron content of the water shall be installed when required by the State Board of Health; and

2nd. That the proposed supply wells should be abandoned and new wells installed at a site satisfactory to the State Board of Health, if future examinations should show a deterioration in the sanitary quality of the supply.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to call the attention of the village officials to the desirability of installing duplicate pumping equipment as soon as the financial condition of the village will permit; and to inform them that the foregoing approval for a water supply obtained from wells at a site disapproved by the State Board of Health July 18, 1912, is granted owing to the present satisfactory sanitary quality of the supply and that the Board reserves the right to require the installation of new wells at a more favorable location if future examinations show a deterioration in the sanitary quality of the supply.

It was moved by Dr. Brown and seconded by Mr. Hartzell to approve the plans for proposed sewerage and sewage treatment plant for Columbiana, received from Mr. E. G. Bradbury, consulting engineer for the village, August 12, 1913, subject to the following conditions:

1st. That a competent person shall be engaged to superintend the maintenance of the sewerage system and sewage treatment works;

2nd. That the village council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary sewers and enforcing connections to the proposed sewers to secure the abandonment of existing cesspools and privy vaults;

3rd. That the proposed filtering material shall be approved by the Engineer of the State Board of Health before the same is placed; and,

4th. That this approval shall be void after January 1, 1915, unless the proposed sewage treatment plant and sewerage system shall have been constructed prior to that date.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Sutton to approve the proposed water supply for Hubbard, developed according to plans received October 24, 1912, from Mr. William Wilson, of Youngstown, engineer for the village, subject to the following conditions:

1st. That the village council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, preventing the establishment or maintenance of any privy vault, cesspool or other possible source of contamination of the supply within 500 feet of any public supply well; and,

2nd. That this approval shall be void after January 1, 1914, unless the proposed supply shall have been placed in use prior to that date.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the authorities that a duplicate well and pumping equipment should be installed to provide for emergencies which may arise to interfere with constant pumping.

It was moved by Mr. Hartzell and seconded by Dr. Brown to approve the general plans for proposed improvement of the public water supply at Ravenna, received from Mr. W. H. Linton, director of public service, August 12, 1913, providing (a) enlargement of the supply by utilizing the flow of the New Milford branch, the County Ditch, and the Congress Lake outlet (so-called) and (b) the installation of a water purification plant and improved pumping machinery, subject to the following conditions:

1st. That prior to June 1, 1917 (a) contracts for the development of the New Milford branch and County Ditch (so-called) and for the installation of a water purification plant shall have been awarded, and (b) all property surrounding and lying within 100 feet of the high water elevation of Muzzy Lake shall have been purchased if the lake is retained as a source of supply; and,

2nd. That before contracts for the development of an additional supply and installation of a water purification plant are awarded, and prior to January 1, 1917, detail plans for the improvements shall have been submitted to and received the approval of the State Board of Health.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the city authorities that the practicability of purifying by coagulation and rapid sand filtration the water obtained from Muzzy Lake at elevation 1050 should be determined before detail plans are prepared in accordance with the general plans and report received from Mr. Linton, August 12, 1913.

It was moved by Dr. Brown and seconded by Dr. Grube to approve the plans for proposed sewerage for Ripley, prepared by Mr. E. F. Layman of Cincinnati, engineer for the village, received July 30, 1913, from Mr. D. W. Lemon, village clerk, subject to the following conditions:

1st. That the dry weather flow of sewage shall be discharged through a cast iron outlet extended and submerged at least 6 feet below the low water elevation of the Ohio River;

2nd. That an intercepting sewer and sewage treatment plant to provide proper disposal of the dry weather flow, shall be installed when deemed necessary by the State Board of Health; and,

3rd. That this approval shall be void unless plans for a submerged outlet shall have been submitted prior to February 1, 1914, and unless the proposed sewers shall have been installed prior to November 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Mr. Hartzell to approve the plans for a proposed sewage treatment plant for New Philadelphia, received August 12, 1913, from Mr. George A. Arnold, city engineer, subject to the following conditions:

1st. That the contact filters, as shown on the plans, may be temporarily omitted, and that these devices shall be installed when deemed necessary by the State Board of Health;

2nd. That the design of the sedimentation tanks shall be revised in a manner satisfactory to the State Board of Health to provide a period of flow of at least four hours;

3rd. That apparatus for the disinfection of the effluent from the sedimentation tanks shall be provided;

4th. That an outlet of special construction to secure good dispersion of the effluent in the Tuscarawas River shall be installed;

5th. That a competent person shall be employed to attend to the operation of the proposed sewage treatment plant; and,

6th. That this approval shall be void unless revised plans conforming to the foregoing conditions of approval shall have been submitted to the State Board of Health prior to January 1, 1914, and unless contracts for the installation of a sewage treatment plant shall have been awarded prior to May 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The proposed methods of sludge disposal at the sewage treatment plant at Columbus, as outlined in a communication received from Mr. S. A. Kinnear, director of public service, July 31, 1913, was considered.

It was moved by Dr. Grube and seconded by Dr. Miller that the Board take the following action:

A. To withhold approval of the first and second proposed methods involving (a) disposal of sludge in flood water whenever this practice is warranted, and when river conditions are not favorable, storage of sludge and subsequent disposal in flood water, and (b) disposal of sludge in flood water whenever this practice is warranted, and disposal by use of sludge drying beds whenever flood water disposal is not available.

B. To grant approval of the third proposed method involving abandonment of disposal of sludge in flood water, and disposal by use of sludge drying beds, subject to the following conditions:

1st. That plans for sludge drying beds shall have been submitted to the State Board of Health prior to April 1, 1914, and that suitable sludge drying beds shall have been installed prior to September 1, 1914; and,

2nd. That the use of the first proposed method of sludge disposal involving disposal of sludge in flood water whenever this practice is warranted, and whenever river conditions are not favorable, storage of sludge and subsequent disposal in flood water, may be practiced until sludge drying beds shall have been installed.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the city officials that the Board is of the opinion that in the study of the problem of sludge disposal, consideration should be given to the advisability of providing for storage and digestion of the sludge prior to its discharge upon drying beds.

It was moved by Dr. Brown and seconded by Dr. Miller to approve the revised general plans for a proposed water purification plant for Steubenville, received August 5, 1913, from Messrs. Chester and Fleming, consulting engineers for the city, subject to the following conditions:

1st. That before contracts for the installation shall have been awarded, detail plans of the proposed water purification plant shall be submitted to and approved by the State Board of Health; and.

2nd. That this approval shall be void unless the aforesaid detail plans shall have been submitted prior to January 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to notify the city officials that the foregoing action of the Board is an approval of the location and general features of the proposed water purification plant, and that the approval of the details of design will be held in abeyance pending the submission of complete detail plans.

It was moved by Dr. Miller and seconded by Dr. Sutton to approve the plans for a proposed intercepting sewer for Wapakoneta, received August 19, 1913, from Mr. A. E. Kimberly, consulting engineer for the city, subject to the following conditions:

1st. That the intercepting sewer shall be extended and sewage treatment works shall be installed when required by the State Board of Health;

2nd. That the city council shall pass an ordinance, approved by the Secretary of the State Board of Health, defining the proper use of sanitary, combined and storm water sewers and regulating the connections thereto;

3rd. That the portion of the proposed intercepting sewer within 200 feet of any of the public water supply wells shall be constructed of cast iron pipe with leaded joints; and,

4th. That this approval shall be void unless contracts for the construction of the proposed intercepting sewer shall have been awarded prior to May 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the city officials to have prepared plans for sanitary sewers for the district north of the Auglaize River, and to install sewers in that district at an early date.

The Board took up the complaint of the board of health of the city of Canton and of the trustees of Canton Township, Stark County, that the city of Canton is discharging and permitting to be discharged, sewage and other wastes into Nimishillen Creek, and by reason thereof is so contaminating said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of citizens of the city of Canton and Canton Township, Stark County, Ohio, who reside in the vicinity of said creek.

The Secretary read the recommendations contained in the report of the chief engineer, who had investigated the complaints, and it was moved by Mr. Hill and seconded by Dr. Miller that the Board find from said report that Nimishillen Creek at and below the outlet of the sewage treatment plant of the city of Canton is seriously polluted by the discharge of improperly treated sewage, and that conditions are thereby caused which are detrimental to the health and comfort of the citizens of the city of Canton and of Canton Township, Stark County, Ohio.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell. Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was then moved by Mr. Hill and seconded by Dr. Sutton that the authorities of Canton be given an opportunity to be heard and to show cause, if any exists, why the city should not be required to install a new sewage treatment plant prior to January 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs, Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Secretary then presented a resolution of the council of Canton, adopted August 25, 1913, waiving its right to notice and hearing and authorizing the mayor to consent in writing in behalf of said city to follow whatever rules or orders the State Board of Health might make in the premises.

The said mayor having filed notice of waiver of right of a hearing and an answer admitting the justness of the complaints, it was moved by Mr. Hill and seconded by Dr. Miller that the report of the chief engineer be now approved and confirmed and that the Board adopt the following order:

> "*Be it ordered by the State Board of Health of the State of Ohio,* That the city of Canton install and have in operation prior to January 1, 1915, the necessary sewers and a new sewage treatment plant to correct the conditions as set forth in petitions of the trustees of Canton Township, Stark County, and of the board of health of the city of Canton, received July 10th and 11th, 1913, respectively, and as found and determined by the State Board of Health."

It was thereupon moved by Mr. Hill and seconded by Dr. Miller that the findings and order of the Board be transmitted to the Governor and the Attorney General for their action thereon.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The report of the special committee (the engineering committee and the chief engineer) appointed to investigate the condition of Greenville Creek at Greenville was received.

This report stated that the council of Greenville would take under consideration the advisability of proceeding to install a sewage treatment plant without referring the question to a board of referee engineers, and advised that the Board defer consideration of the appointment of a referee engineer.

It was moved by Mr. Hill and seconded by Dr. Miller to file the report and continue the committee.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Board took up for consideration the report of its special committee upon an investigation of the pollution of the Rocky River at Lakewood.

It was moved by Dr. Miller and seconded by Dr. Grube that the Board find, from the report of its committee, that the Rocky River at and below the outlet of the sewage treatment plant of the city of Lakewood is polluted by the discharge of untreated or improperly treated sewage, and that the water supply of the village of Rocky River obtained from this stream is thereby contaminated.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Dr. Miller and seconded by Dr. Grube that the Secretary be instructed to notify the authorities of Lakewood of the Board's findings and to state that the Board has fixed 8 P. M., Wednesday, the fifteenth day of October 1913, at the Havlin Hotel, Cincinnati, as the time and place, when and where the city of Lakewood may have an opportunity to be heard and to show cause, if any exists, why the said city should not be required to improve and enlarge the existing sewage treatmet plant prior to January 1, 1915, or to install a new sewage treatment plant prior to June 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board then took up the report on the general plans, received from Mr. V. T. Price, director of public service, August 12, 1913, for proposed intercepting sewer for the Mill Creek District, Cincinnati, with temporary discharge into the Ohio River.

It was moved by Dr. Grube and seconded by Dr. Brown to defer action on these plans and to have further investigation made and reported upon at the next meeting.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a telegram from the contractors at Painesville, stating that it would not be possible to complete the work on the water works intake at Painesville and asking for an extension of time.

No action was taken.

The Secretary presented a petition from the board of health of Toledo, Lucas County, Ohio, asking the State Board of Health to investigate the pollution of the Maumee River by sewage and other wastes from the village of Maumee.

On motion of Dr. Brown, seconded by Dr. Grube this matter was referred to the engineering department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a petition from the board of health of Toledo, Lucas County, Ohio, asking the State Board of Health to investigate the pollution of the Maumee River by sewage and other wastes from the village of Perrysburg.

On motion of Mr. Hill seconded by Dr. Grube the matter was referred to the engineering department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a resolution adopted by the board of health of Columbus, August 5, 1913, declaring that the cities of Marion and Kenton, and the villages of Prospect and Magnetic Springs, located in Marion, Hardin and Delaware counties, are discharging and permitting to be discharged sewage and other wastes into the Scioto River and tributaries, and by reason thereof are polluting the Scioto River which is used as a source of public water supply for the city of Columbus, Franklin County, Ohio.

The resolution was accepted and placed on file, inasmuch as the Board now has under investigation complaints in reference to the pollution of the Scioto River watershed.

Mr. Hill presented the matter of nuisances at St. Bernard, created by certain industries, recommending that representatives of the various industries concerned be cited to appear before the Board at its next regular meeting; that the Secretary be instructed to take up with the Attorney General the matter of the Board's jurisdiction in requiring the abatement of the nuisances, and to request that a representative of the Attorney General's department attend the next regular meeting and advise the Board in regard to methods of procedure.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a list of health officers, who had been appointed by their respective councils to serve in lieu of a board of health.

On motion of Dr. Brown, seconded by Mr. Hill, these health officers were approved.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the application Mrs. Mary A. Fetters, to conduct a maternity boarding house and lying-in hospital at 445 Highland Avenue, Columbus, providing for the care of four women or eight children.

It was moved by Dr. Brown and seconded by Mr. Hill to grant this license.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the following applications for a renewal of a license to conduct a maternity boarding house and lying-in hospital in Cleveland:

Joanna P. Ortlieb, at 933 East 78th Street, providing for the care of six women or eight children.

St. Ann's Infant Asylum, 3409 Woodland Avenue, providing for the care of one hundred and eight women and two hundred and thirty children.

The Salvation Army Maternity Home, 5902 Kinsman Road, providing for the care of five women or eleven children.

It was moved by Dr. Grube and seconded by Dr. Brown to renew these licenses.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary called attention to the next meeting of the American Public Health Association, to be held in Colorado Springs, September 9-13, 1913.

On motion of Dr. Brown, seconded by Dr. Grube, the President, Vice President and Secretary were appointed delegates to represent the Board at this meeting.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a letter from the chief engineer in regard to his attending the meeting of the American Public Health Association, to present a paper which he had been invited to prepare.

No action was taken.

The Secretary presented a letter from the chief engineer in regard to the termination of the services of Mr. R. M. Lee in the engineering department, and recommended that additional assistance be secured and paid on an hourly basis.

Mr. Hill moved to approve this recommendation. The motion was seconded by Dr. Brown.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the resignation of Mr. Harold E. Babbitt, as assistant engineer.

On motion of Mr. Hill seconded by Dr. Brown this resignation was accepted with regret.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a memoranda of the chief engineer, in which it was stated that the plumbing in a large number of buildings in Lakeside, Ohio, had not been installed in conformity with the Building Code, and recommending that the Board direct the State Inspector of Plumbing to make an investigation in accordance with Section 1261-4 of the General Code.

It was moved by Mr. Hill and seconded by Dr. Brown to instruct the State Inspector of Plumbing to make such investigation.

Those voting in the affirmative were Messrs. Hesencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Board then adjourned to meet at the Havlin Hotel, Cincinnati, the third Wednesday in October.

Attest: E. F. McCampbell,
Secretary.

Approved, October 15, 1914.

OCTOBER MEETING
1913

A regular meeting of the State Board of Health was held at the Grand Hotel, Cincinnati, 8 P. M., October 15, 1913. Present, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In answer to a request for a conference relative to complaints of nuisances at St. Bernard, caused by several large manufacturing plants, there appeared representatives of the Proctor-Gamble Company, The Globe Soap Company, The Jarecki Chemical Company, The Emery Candle Company, Bowker Fertilizer Company and the Joslin-Schmidt Company. There also appeared Dr. J. H. Landis and Mr. W. C. Folsom of the Cincinnati health department, representatives of the Business Men's Club, and several improvement associations, and a number of residents of the sections of the city affected by odors from these plants.

On motion of Dr. Brown, seconded by Dr. Grube, the complainants and representatives of the manufacturing plants were given twenty minutes each to present their side of the controversy. Carried.

By special request Mr. Hill acted as chairman.

Dr. Sutton suggested that before the inquiry started it would be in order to learn the opinion of the Attorney General as to the jurisdiction of the State Board of Health in the abatement of local nuisances.

The Assistant Secretary stated that a conference had been held with the Attorney General and some of his assistants on the St. Bernard nuisances and that it is the opinion of the Attorney General that this is a local matter to be handled by the local authorities, either by the board of health under its authority to abate nuisances, or by complaint to the grand jury for criminal proceedings. He also stated the Attorney General held that the State Board of Health did not have jurisdiction in local matters, except in cases where the public health was endangered and the local officials failed or refused to act, or in the event of an emergency that the local board of health is unable to take care of.

Dr. Landis stated that when he first went into office there were many complaints of odor nuisances and that the department had been able to secure the abatement of all such nuisances in the city but was unable to reach the source of the present complaints owing to lack of jurisdiction.

Mr. Leo Blume, engaged in the packing business in Cincinnati, told of methods followed by his company in correcting insanitary conditions at their plant and stated it is his opinion that any of the industries at St. Bernard could do away with all offensive odors by installing proper machinery.

Mr. James K. Morrison, president of the Clifton Improvement Association, stated that complaints were of long standing and that much public property was being injured as well as private property. He believed that the new city hospital would be greatly damaged if something is not done soon.

Mr. Charles A. Hinsch, of Avondale, attempted to describe the odors affecting the community in which he lived and the effect of the odors on the health of the people.

Mr. W. C. Folsom, chief sanitary inspector of the Cincinnati health department, gave the result of an inspection of some of the factories and detailed the efforts made by some to eliminate the creation of odors. He had not been able to make a complete investigation.

Mr. J. J. Burchenel, of the Proctor-Gamble Company, stated that his plant does not produce offensive odors but the company will do anything that will better any condition that can be found to be a source of complaint.

Mr. Franklin Ives, of the Globe Soap Company, stated that his plant had been located in Cincinnati for twenty-five years without complaint but if the company can be shown where an improvement can be made it will welcome the suggestion. Mr. Ives lives in Clifton and is not affected by the odors of which others complain. He stated that there are soap factories in the heart of nearly all the large cities and that these are operated without complaint.

Mr. Gustav Jarecki, of the Jarecki Chemical Company, described the gases produced at his plant and the methods used to control these gases.

Mr. A. R. Berrman, of the Emery Candle Company, stated that his plant was not in operation when the investigation was made by Mr. Hall and he did not know the source of Mr. Hall's information. He stated that all vapors produced are condensed by a jet of steam in a tower.

Mr. C. G. Preston, of the Bowker Fertilizer Company, stated that the complaint of the inactivity of the St. Bernard officials was not true as he knew that they had investigated some of the plants.

Mr. J. D. Oliver, of the Joslin-Schmidt Company, said he was not compelled to defend his plant as the investigation by Mr. Hall showed the plant to be in good condition.

Mr. Hill then suggested that all of the manufacturers get together and agree on the cause and a remedy. This brought the response that this method had been tried without results.

Mr. Burchenel stated that he would be glad to have Dr. Landis send some one to St. Bernard to make a thorough investigation and report. He said he would give the inspector every assistance possible in the investigation and would agree to carry out any reasonable suggestions made. Other manufacturers present agreed to this proposition.

The Board then took up the complaints of the condition of Mill Creek.

Mr. James O. Gibson, of Hartwell, described the condition of the creek from Hartwell to the Cincinnati corporation limits. He stated that flushing the creek with water from the canal had aided in bettering conditions for two or three years but that it had been impossible to get this aid during the past summer. He suggested that the State Board of Health endeavor to have the Superintendent of Public Works flush the creek on Saturday and Sunday of each week.

Dr. Landis described the condition of the creek at the time of his last inspection. He stated that the manufacturing plants along Mill Creek must use the creek to dispose of their wastes until the intercepting sewer is completed and urged the completion of the sewer at the earliest time possible.

Mr. Hinsch, Mr. Morrison, Mr. W. J. Salway, superintendent of Spring Grove Cemetery, and Dr. Otto P. Geier, spoke of the condition of the creek and urged the construction of the interceptor without delay.

Dr. Grube moved the adoption of the following resolution:

> WHEREAS, Recognizing that Mill Creek is badly polluted with sewage and manufacturing wastes and that flushing with water from the canal has assisted in alleviating the nuisance at such times as it has been possible to have water turned into the creek from the canal,
>
> *Be it resolved,* That the Secretary of the State Board of Health be directed to bring this matter to the attention of the Governor with the request that he instruct the Superintendent of Public Works to waste into Mill Creek at a point near the location of the lower so-called Lockland aqueduct, all the water that can be spared from the canal at that point.

The motion was seconded by Dr. Sutton and carried.

Mr. H. M. Waite, city engineer of Cincinnati, was asked by Mr. Hill to explain why arrangements were being made to let contracts for the construction of middle sections of the Mill Creek intercepting sewer instead of beginning at the end. Mr. Waite explained that this was advisable because of the reconstruction of railroad yards and that the work can be done much cheaper now than after the railroad improvement is completed. He also stated that the sewer had been planned to provide for the possibility that treatment of the sewage may be demanded by the Federal government.

Mr. J. O. White, representing the Business Men's Club of Cincinnati, and Dr. S. C. Swartsel, representing various civic organizations, stated that their organizations heartily endorsed the construction of the Mill Creek intercepting sewer and urged the construction of the sewer at the earliest time possible.

It was moved by Dr. Grube, seconded by Dr. Brown that the Board go into executive session.

By request of Mr. Hill the report of the engineering committee was taken up for consideration.

It was moved by Dr. Miller and seconded by Dr. Sutton that the plans for proposed sewerage and a sewage treatment plant for The Andrew Schell Sub-division No. 2, Cleveland, received from Mr. F. B. Krause, civil engineer, October 6 and 8, 1913, be approved subject to the following conditions:

1st. That sand having an effective size of 0.4 to 0.6 m.m. and a uniformity coefficient of not more than 2.0 shall be used as a filtering medium in the intermittent and sludge filters; and that samples of the sand to be used shall be approved by the engineer of the State Board of Health before being placed;

2nd. That the owners of the proposed sewage treatment plant shall employ a caretaker to visit the plant at least twice each week and attend to its proper operation;

3rd. That the entire plant shall be abandoned and removed as soon as sanitary sewers for that district shall have been constructed by the city of Cleveland;

4th. That the plant shall be enlarged in a manner satisfactory to the State Board of Health when deemed necessary by said Board; and,

5th. That this approval shall be considered void unless the proposed sewerage and sewage treatment plant shall have been constructed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Brown and seconded by Dr. Grube that the plan and profile for a proposed storm sewer for New Straitsville, received from Mr. H. L. Maddocks, engineer for the village, September 11, 1913, be approved subject to the following conditions:

1st. That the proposed sewer shall be used strictly as a storm water sewer and that no sanitary wastes shall be permitted to be discharged therein; and,

2nd. That this approval shall be void after December 1, 1913, unless the village council shall have enacted, prior to that date, an ordinance to be previously approved by the Secretary of the State Board of Health regulating the use of and connections to the proposed sewer.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the authorities as follows:

The construction of the proposed storm sewer should not have been undertaken until the plans had been submitted to and approved by the State Board of Health as provided by law. The installation of a storm sewer without provision of a sanitary sewer for the removal of sewage is not advisable. Ultimately a complete system of sanitary sewers for the village will be required and a sewage treatment plant will be necessary to prevent a nuisance. In the interest of economy, as well as improved sanitation, plans for a comprehensive system of sanitary sewers for the village should be secured, and that portion of the system extending along Railroad Street should be installed prior to the paving of that street.

It was moved by Dr. Grube and seconded by Dr. Brown to approve the plans for proposed storm sewers for Rugby Place, Main Sewer District No. 1, Lucas County, received from Mr. Wm. H. Gould, county sanitary engineer, August 14, 1913, subject to the following conditions:

1st. That the Board of County Commissioners of Lucas County shall control the establishment of connections to the proposed sewers and shall adopt and submit to the State Board of Health regulations to provide proper use of the sanitary and storm water sewers, and that the proposed sewers shall not be used to remove sewage or other objectionable wastes; and,

2nd. That this approval shall be void unless the aforesaid regulations shall have been adopted and submitted to the State Board of Health prior to January 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Board took up the complaints of the trustees of Turtle Creek and Union townships, Warren County, that the village of Lebanon is discharging and permitting to be discharged, sewage and other wastes into Turtle Creek and by reason thereof is so corrupting said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of these townships who reside in the vicinity of said creek.

The Board having before it the report of the engineering department upon an investigation of the complaints, it was moved by Dr. Brown and seconded by Dr. Miller, that the Board find from said report that Turtle Creek, below the village of Lebanon, is polluted by the untreated sewage from the village and that conditions are thereby caused that are detrimental to the health and comfort of citizens of Turtle Creek and Union townships, Warren County.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was then moved by Dr. Brown and seconded by Dr. Miller that the Secretary be instructed to notify the authorities of Lebanon of the Board's finding and to state that the Board has fixed 3 p. m., Wednesday, the 3rd day of December, 1913, at the Secor Hotel, Toledo, as the time and place, when and where, the village of Lebanon may have an opportunity to appear and to show cause, if any exists, why the said village should not be required to install a sewage treatment plant prior to June 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board took up the complaint of the trustees of Chippewa Township, Wayne County, that The Ohio Boxboard Company at Rittman, Wayne County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Chippewa Creek, and by reason thereof is so corrupting said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Chippewa Township, Wayne County, Ohio, who reside in the vicinity of said creek.

The Board having before it the report of its engineering department, upon an investigation of the complaint, it was moved by Dr. Miller and seconded by Dr. Sutton that the Board find from such report that Chippewa Creek below the mouth of the Styx River is seriously polluted by wastes from the plant of The Ohio Boxboard Company at Rittman, and that conditions are thereby created that are detrimental to the comfort of citizens of Chippewa Township, Wayne County.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton. Miller and Brown. Nays, none.

It was then moved by Dr. Miller and seconded by Dr. Sutton that the Secretary be instructed to notify The Ohio Boxboard Company of its finding and to state that the Board has fixed 3 P. M. Wednesday, the 3rd day of December 1913, at the Secor Hotel, Toledo, as the time and place, when and where, representatives of the said company may have an opportunity to appear and to show cause, if any exists, why the company should not be required to install a plant for the treatment of its wastes prior to November 1, 1914.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board took up the complaint of the board of health of the city of Toledo, Lucas County, Ohio, that the village of Maumee, Lucas County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Maumee River, and by reason thereof is polluting said river, which is used as a source of public water supply for the city of Toledo, thereby creating conditions that are detrimental to the health and comfort of the citizens of the said city.

The Board having before it the report of an investigation of the complaint by its engineering department, it was moved by Dr. Grube and seconded by Dr. Sutton to defer action upon the petition of the board of health of Toledo, received July 30, 1913, and to instruct the Secretary to cite representatives of the village of Maumee, the city of Toledo and the commissioners of Lucas County to appear before the Board at its next meeting, to be held at 3 P. M. Wednesday, December 3, 1913, at the Secor Hotel, Toledo, Ohio, to confer (1) relative to the question of providing suitable sanitary sewers and sewage treatment works to serve the village of Maumee and that portion of Lucas County lying between the city of Toledo and the village of Maumee northwest of the Maumee River; and (2) relative to the question of relocation of the Toledo water works intake.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube Hill, Sutton, Miller and Brown. Nays, none.

The Board took up the complaint of the board of health of the city of Toledo, Lucas County, Ohio, that the village of Perrysburg, Lucas County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Maumee River, and by reason thereof is polluting said river, which is used as a source of public water supply for the city of Toledo, thereby creating conditions that are detrimental to the health and comfort of the citizens of the said city.

The Board having before it the report of an investigation of the complaint by its engineering department, it was moved by Dr. Brown and seconded by Dr. Sutton to defer action upon the petition of the board of health of Toledo, received July 30, 1913, and to instruct the Secretary to cite representatives of the village of Perrysburg and of the city of Toledo to appear before the Board at its next meeting, to be held at 3 P. M., Wednesday, December 3, 1913, at the Secor Hotel, Toledo, Ohio, to confer (1) relative to the question of providing suitable sanitary sewers and sewage treatment works to serve the village of Perrysburg; and, (2) relative to the question of relocation of the Toledo water works intake.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Secretary presented a communication from Mr. A. B. Hollenbaugh, director of public service, enclosing a resolution adopted by the council of the city of Fostoria on September 23, 1913, requesting an extension of time for the completion of the sewage treatment plant for the city of Fostoria, from January 1, 1914, to September 1, 1914, stating that it would be impossible for the city to secure a contractor who would undertake to do the work during the fall and winter months within the time allowed by the Board.

It was moved by Dr. Brown and seconded by Dr. Sutton that the Board grant the city of Fostoria this extension of time, namely, until September 1, 1914, in which to complete the improvements, as provided in an order of the State Board of Health dated December 2, 1912, and that the Secretary be instructed to prepare a supplemental order embodying this action and submit the same to the Governor and the Attorney-General for their approval.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Dr. Sutton and seconded by Dr. Grube to disapprove the plans for additional sewerage for Coshocton, received from Mr. A. M. Fisher, city engineer, August 28, 1913.

Those voting in the affirmative were, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to inform the city officials that while the general design of the proposed additional sewers is satisfactory, the State Board of Health will not permit their installation until steps have been taken to provide a sewage treatment plant to serve the entire city; such plant to include as its main features, devices for clarification and disinfection of the sewage.

It was moved by Dr. Brown and seconded by Dr. Grube to approve the revised detail plans for a proposed water purification plant for Steubenville, received September 19, 1913, from Messrs. Chester and Fleming, consulting engineers, subject to the following conditions:

1st. That samples of filtering material shall be submitted to and receive the approval of the engineer of the State Board of Health before the same is placed;

2nd. That a competent analyst experienced in water purification shall be employed to provide accurate analytical control of the operation of the plant, and that daily records of operation of the plant shall be submitted to the State Board of Health at monthly intervals;

3rd. That the use of coagulants and disinfectants shall at all times be subject to the approval of the State Board of Health; and.

4th. That this approval shall be void unless construction of the water purification plant shall have been commenced prior to July 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the city officials of the necessity of improving the low service reservoirs to serve as receptacles for filtered water; and that the reservoir at present lined with masonry should be cleaned and provided with a cover, and the other reservoir, which is an open excavation, should be reconstructed and provided with a suitable lining and cover.

A statement of the special committee, consisting of the engineering committee and the chief engineer, upon further investigation of the proposed Mill Creek Intercepting sewer, Cincinnati, was presented.

It was moved by Dr. Brown and seconded by Dr. Grube that the statement of the special committee be received and filed and that the Board confirm the action of the engineering committee of October 3, 1913, suggesting to the city officials, that the general plans for the proposed Mill Creek interceptor which had been approved by Mr. Harrison P. Eddy, consulting engineer for the city, be submitted to two other expert consulting sanitary engineers for examination and report before the said plans were submitted to the Board for approval.

Those voting in the affirmative were Messrs. Hasencamp. Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary then presented a report, signed by Mr. Allen Hazen and Mr. George W. Fuller of New York, submitted in compliance with the advice of the engineering committee given October 3, 1913, endorsing the general plans for the proposed intercepting sewer for the Mill Creek District, Cincinnati, received from Mr. Victor T. Price, director of public service, August 12, 1913, and on motion of Mr. Hill, seconded by Dr. Grube, these general plans were approved subject to the following conditions:

1st. That sewage treatment works, the location and design of which shall be satisfactory to the State Board of Health, shall be installed to treat the dry weather discharge from the proposed interceptor whenever in the opinion of said Board such works shall have become necessary to prevent serious pollution of the Ohio River;

2nd. That complete detail plans and specifications for the proposed intercepting sewer shall be submitted to and shall receive the approval of the State Board of Health before contracts for the construction of the same shall have been awarded; and,

3rd. That this approval shall be void unless the aforesaid detail plans shall have been submitted prior to June 1, 1914, and construction of the proposed intercepting sewer shall have been commenced prior to January 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

Dr. Grube called the attention of the Board to the condition of the sewage treatment plant at Xenia, and suggested that the city officials be cited to appear at the next meeting of the Board.

It was moved by Mr. Hill and seconded by Dr. Sutton that the city officials of Xenia be cited to appear at the next meeting of the Board.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Secretary presented a petition from the trustees of Jennings Township, Putnam County, Ohio, asking the State Board of Health to investigate the condition of Jennings Creek, which they alleged is being polluted by "sewage and other wastes from the city of Delphos and others."

On motion of Mr. Hill, seconded by Dr. Grube, the complaint was referred to the Engineering Department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a petition from the board of health of the village of Vermilion, Erie County, Ohio, asking the State Board of Health to investigate the pollution of open ditches draining into Vermilion River and Lake Erie, by sewage and other wastes from the said village.

On motion of Mr. Hill, seconded by Dr. Grube, this complaint was referred to the engineering department for investigation and report.

Those voting in the affirmative were Messrs. Hasencamp. Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a communication from T. J. Ross, solicitor for the city of Lakewood, under date of October 14, 1913, in which it was stated that the notice of hearing and citation to appear before the Board with reference to the complaint against the sewage treatment plant had come before council for consideration on Monday, October 13, 1913, and that he was authorized to waive right of hearing, and to say that council did not desire to introduce evidence or offer protest against the issuing an order requiring the city to improve and enlarge the existing sewage treatment plant prior to January 1, 1915, or to install a new sewage treatment plant prior to June 1, 1915.

No evidence having been offered or protest made against the issuing of the Board's order, it was moved by Mr. Hill and seconded by Dr. Miller that the report of the Board's committee be now approved and confirmed, and that the Board adopt the following order:

"Be it ordered by the State Board of Health of the State of Ohio, that the city of Lakewood, Cuyahoga County, Ohio, provide sewage treatment works, satisfactory to the State Board of Health, before June 1, 1915, to correct the conditions as set forth in a resolution of the council of the village of Rocky River, passed January 2, 1913, and received by the State Board of Health January 6, 1913, and as found and determined by the State Board of Health from investigations made February 13th and June 27, 1913."

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was thereupon moved by Mr. Hill and seconded by Dr. Miller that the Board's finding and order be transmitted to the Governor and the Attorney-General for their action thereon.

The roll call upon the adoption of this motion resulted as follows:

Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Mr. Hill and seconded by Dr. Brown to approve the minutes of the September meeting.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Mr. Hill to approve the Secretary's report which included the following:

The recommendation that Miss Mary Louise Mark, statistician in the Division of Tuberculosis, be given an indefinite leave of absence, on account of an incipient affection of tuberculosis, in order that she may take proper treatment; and that during her absence Miss Sara Kerr be designated as acting statistician, at a salary of $75.00 per month.

The appointment of Dr. Raymond A. Ramsey to succeed Prof. Starin for work in the Division of Occupational Diseases on a basis of $5.00 per day for full time service, plus the usual allowance for expenditures incurred in the pursuit of his official duties.

The approval by the Secretary, (in accordance with the resolution adopted by the Board, May 22, 1913,) of the following:

September 9, 1913, plans for proposed sewerage and sewage treatment plant for the high school building at Convoy, received August 12, 1913, from the American Warming and Ventilating Company of Toledo, subject to the following conditions:

1st. That the plant shall be abandoned and removed whenever a sanitary sewer shall have become available for the removal of the sewage from the school building;

2nd. That a course of graded gravel be placed immediately surrounding the distributing and underdrainage lines;

3rd. That the sludge be removed from the tank at intervals not greater than one month during the school year.

September 11, 1913, of plans for sewage treatment plants for the Grant Street School and the Stevens Street School at Newark, received August 27, 1913, from Mr. Vernon Redding, architect, subject to the following conditions:

1st. That direct ventilation of the septic tanks, dosing chamber and filter chambers shall be provided by connection to the main ventilation stacks of the respective school buildings;

2nd. That double automatic alternating siphons be substituted for hand controlled siphons;

3rd. That sand having an effective size of 0.4 to 0.6 m.m. and a uniformity coefficient of not more than 2.0 shall be used as a filtering medium, and that samples of the sand to be used shall be approved by the Engineer of the State Board of Health before being placed;

4th. That the ventilators for the underdrains of the filters shall be of iron pipe and shall extend at least 12 inches above the surface of the sand;

5th. That the board of education of the city of Newark shall employ a competent caretaker to attend to the operation of the proposed plants;

6th. That the proposed sewage treatment plants shall be abandoned and removed as soon as a sanitary sewer shall have become available for the removal of the sewage from the school buildings; and

7th. That this approval shall be void unless the proposed sewage treatment plants shall have been constructed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Brown to approve the financial report, this being a statement of the expenditures from September 1st, to and including October 15, 1913, and a statement of balances available on October 15, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Brown to approve a list of health officers who had been appointed by their respective councils to serve in lieu of a board of health.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary recommended that after an investigation he be authorized to appoint a suitable person as health officer in any village or township where the council or township board of health has refused or neglected to make the appointment, such action to be confirmed by the Board at its next meeting.

It was moved by Dr. Miller and seconded by Dr. Grube to approve this recommendation.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the application of Mrs. John Kratz, for renewal of her license to conduct a maternity boarding house and lying-in hospital at 399 East Market Street, Akron, Ohio, providing for the care of four women or eight children.

It was moved by Mr. Hill and seconded by Dr. Grube to grant a renewal of this license.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the application of Miss Lissa Thompson to conduct a maternity boarding house at 388 Glenaven Avenue, Youngstown, Ohio, providing for the care of four children.

It was moved by Mr. Hill and seconded by Dr. Grube to grant this license.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary reported the appointment by the President of Harold G. McGee as assistant engineer, at a salary of $85.00 per month.

It was moved by Mr. Hill and seconded by Dr. Brown to confirm this action of the President.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a letter from the State Inspector of Plumbing, calling attention to the fact that the Commissioners of Defiance County have refused or neglected to comply with the recommendation that the men's toilet room located in the basement of the Defiance County Court House be placed in a sanitary condition, and recommending that legal action be brought under Sections 1261-13, 1261-14 and 1261-15, General Code if necessary.

It was moved by Dr. Grube and seconded by Dr. Sutton that the Secretary be instructed to refer this case to the Attorney General for prosecution.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

Dr. Grube presented the matter of issuing a manual of instruction for health officials and moved that such a manual be prepared as soon as possible.

This motion was seconded by Dr. Brown, and carried.

Dr. Brown stated that the Annual Meeting of the Ohio Dental Society would be held in Toledo, December 3rd, 4th, and 5th, and suggested that the Board meet in Toledo at that time if possible.

Dr. Sutton moved that the rule requiring the nomination and election of officers at the November Meeting, and the rule requiring meetings to be held on the third Thursday of the month, be suspended.

This motion was seconded by Dr. Grube.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

Dr. Sutton then moved that the next meeting be held in Toledo at 3 p. m., December 3, 1913, and that officers be nominated, elected and installed at that meeting.

This motion was seconded by Dr. Grube, and carried.

On motion of Dr. Grube seconded by Dr. Brown, the Board adjourned.

Attest: E. F. McCampbell, M. D.,
Secretary.

Approved December 3, 1913.

DECEMBER MEETING
1913

A regular meeting of the State Board of Health was held at the Secor Hotel, Toledo, at 3 p. m., December 3, 1913. Those present were: Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

The Board took up the hearing of delegations cited to appear before the Board at this time.

The Secretary read a letter under date of October 22, 1913, to the mayor and council of the village of Lebanon, requiring the village to be represented at this meeting to show cause, if any exists, why the village should not be required to cease the pollution of Turtle Creek by properly treating the sewage and wastes from the village now being discharged into said creek.

Mr. F. M. Hamilton, Jr., solicitor for the village, stated that he was authorized to represent the village and would present the following resolution adopted by the council and board of health of the village:

"WHEREAS, The State Board of Health has directed the construction of a sewer (sewage) disposal plant for the village of Lebanon, Ohio, and

"WHEREAS, We believe the conditions do not justify the same at this time as there are only a few over 100 closets connected with the sewers of said village; that said sewer empties into Turtlecreek southwest of the village; that said creek has a never failing flow of water, ample for flushing, in addition to the large amount of water discharged through said sewer from our water works system, and

"WHEREAS, We believe that any contamination of said Turtle creek has been caused by the emptying of liquid manure in said creek by the French-Bauer Creamery Company as shown by their recent plea of guilty to the said charge before a magistrate, and possibly some other factory causes, and

"WHEREAS, We believe that any contamination of said creek is not traceable to the insignificant amount of sewage deposited from the sewers of said village, and

"WHEREAS, The outlet of our sewer system was approved by said State Board of Health before the said sewer system was constructed, and

"WHEREAS, Our village is running several thousand dollars behind its present current needs by reason of tax limitations, now therefore

"Be it resolved, by the Council of the village of Lebanon, State of Ohio:

"That the State Board of Health of Ohio, be respectfully requested not to press their order for a sewer (sewage) disposal plant until it is more clearly shown that the conditions are such as demand it from a health standpoint, and that the cause is due to the sewer discharge of said village, and further until there can be some financial relief by legislation or reduction in our bonded indebtedness."

He further stated that the French Bros.-Bauer Company is now installing means for caring for the wastes from its creamery and that the village would ask for time to investigate the effect of such improvements on the water in the creek and to get the money with which to make improvements, if such are found to be necessary.

Upon motion of Mr. Hill, seconded by Dr. Brown, the matter was referred to executive session.

The Secretary read a communication under date of October 22, 1913, to the officials of the Ohio Boxboard Company, of Rittman, relative to a complaint that said company was causing the pollution of Chippewa Creek into which its wastes are discharged.

Mr. R. Winthrop Pratt, of Cleveland, stated that he had been employed by the Ohio Boxboard Company to prepare plans for a method of disposing of the wastes from the plant and on behalf of the company asked for time to complete the plans.

It was moved by Mr. Hill and seconded by Dr. Miller to require the Ohio Boxboard Company to submit within ninety days from this date plans for disposing of its wastes.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board then took up for consideration complaints of the board of health of the city of Toledo that the city water supply was being polluted by sewage and other wastes from the villages of Maumee and Perrysburg. Representatives from Maumee were called for but none were present.

Mr. Edwin L. Clay, mayor; C. F. Chapman, Jr., village solicitor; and Mr. Geo. Champe were present representing the village of Perrysburg; Mr. J. R. Cowell, director of public service, representing the city of Toledo, and Messrs. Charles J. Romeis, county commissioner, and Wm. H. Gould, county sanitary engineer, representing Lucas County.

For Perrysburg, Mr. Chapman stated that the village contributed very little, if any, sewage to the Maumee River and that there were not more than ten or twelve cesspools connected to sewers. He further stated that the water supply of Toledo was affected by the upstream currents in the river due to wind influences and that there was very little downstream current.

Mr. Champe said he had sent to the State Board of Health a plan of the sewers in Perrysburg, that this plan shows that not to exceed thirty residences have sewer connections and that the quantity of sewage discharged into the river is negligible. He stated that at Grand Rapids, the river bed is practically dry during a part of the summer. The village expects to ask permission of the State Board of Health to construct relief sewers and to use the present sewers for storm water until sanitary sewers can be constructed.

Mr. Cowell stated that the complaints made by the city board of health were made at his request and that the villages of Maumee and Perrysburg had been served with notices to stop pollution of the river but that they were not at present financially able to construct sewers and sewage treatment works. It is possible that by joint action with the county commissioners a way may be found that will provide a different outlet for the sewage from these villages. He further stated that many connections had been made with the village sewers without the knowledge of the authorities and that the pollution of the river is increasing. He admitted that at times there is an up current in the river, but not to the extent mentioned by Mr. Chapman.

Mr. Hill asked what was proposed as a solution of the problem.

Mr. Cowell said that it was his thought that both villages should install means for removing the solids from the sewage and clarifying to some extent.

Mr. Hill suggested that such a plant might be constructed for Perrysburg and the sewers for Maumee be connected to the city sewer system. In lieu of such an arrangement the sewers might be extended to a point below the city water works intake.

Mr. Gould said that the county proposed to construct an intercepting sewer from near Maumee and connect with the Toledo sewer system but that this sewer would not be of such size as to carry the sewage of Maumee. This interceptor is for County Sewer Districts 1 and 3. In order to carry the sewage of Maumee it would be necessary to enlarge the interceptor and also the city sewer to which the interceptor connects.

Mr. Cowell stated that sewage was also reaching the river from the County Children's Home, from oil wells, and a number of other sources.

Mr. Chapman asked if it were possible to extend the city's water works above Maumee and Perrysburg or to take the water supply from the canal.

Mr. Cowell stated that such plans had been investigated but were not considered feasible.

Mr. Hill suggested that the city of Toledo, the villages of Maumee and Perrysburg and Lucas and Wood counties get together and devise some plan for removing pollution from the river, and asked Mr. Cowell to take the initiative in securing such a conference.

It was moved by Mr. Hill, seconded by Dr. Miller, to request representatives of the city of Toledo, the villages of Maumee and Perrysburg and of Lucas County and Wood County to meet in joint session for the purpose of securing and adopting a comprehensive plan for removing pollution from the Maumee River caused by sewage from the villages of Maumee and Perrysburg and districts bordering the river in Lucas and Wood counties between said villages and the city of Toledo; and that such plan be submitted to the State Board of Health for approval within four months or prior to April 3, 1914.

The vote on the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board then went into executive session.

The Board took under consideration the matter of the pollution of Turtle Creek by sewage and other wastes from the village of Lebanon.

It was moved by Mr. Hill, seconded by Dr. Brown, to require the village of Lebanon to submit to the Board prior to January 21, 1914, a written statement of the exact conditions concerning the pollution of Turtle Creek by wastes from the French Bros.-Bauer Company; to indicate what steps the said company is taking to prevent pollution of the creek by its wastes, and to state when the pollution of the creek by wastes from the plant of the said company will be abated.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Dr. Brown and seconded by Dr. Grube to approve the minutes of the October meeting.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Brown to approve the report of the Secretary and the recommendations and actions contained therein. These were:

1st. That the following books be purchased:

The Qualitative Analysis of Medical Preparations. By H. C. Fuller, B. S., net $1.50.

Food Inspection and Analysis. By Albert E. Leach. S. B., net $7.50.

Revised and enlarged by Andrew L. Winton, Ph. D.

Helping School Children. By Elsa Denison.

School Hygiene. By Fletcher B. Dresslar.

Modern Medicine (New Edition) five volumes. By Sir. William Osler, M. D., and Prof. Thomas McCrae, $5.00.

2nd. The appointment of the following health officers, the township board of health having refused to make such appointment:

November 3, 1913, Dr. F. H. Hurd, of Hiram, as health officer of Hiram Township, Portage County, for a term of one year, at a salary of $50.00.

November 13, 1913, Dr. E. A. Bechtol, of Montpelier, as health officer of Bridgewater Township, Williams County, for a term of one year, at a salary of $50.00.

3rd. The employment, November 11, 1913, under authority granted at the September 2, 1913 meeting, of David E. Adams on the hourly basis in the Engineering Department, at a rate of thirty cents per hour.

4th. Upon recommendation of the Secretary, the appointment by the President, of Miss Anna Fornoff, general clerk, at a salary of $60.00 per month, to succeed Miss Helen O'Connor, resigned, to take effect November 24, 1913.

5th. The following increases in salaries:

In the engineering department, Mr. M. Z. Bair, principal assistant engineer, from $1,500 to $1,800 per year;

Mr. L. H. Van Buskirk, assistant engineer, from $1,400 to $1,700 per year.

Miss Corinne Dwight, correspondence clerk, from $900 to $1,000 per year;

Miss Ruth Clifton, stenographer in the Division of Tuberculosis, from $660 to $720 per year;

Miss Margaret Richter, stenographer, from $600 to $660 per year.

6th. The approval by the chief engineer, November 15, 1913, of revised plans submitted November 1, 1913, for sewage treatment for the Interstate Stock Yards at Toledo, which provide proper facilities for removal of sludge, and comply with the first condition of the Board's approval of July 23, 1913.

7th. In accordance with the resolution adopted by the Board, May 15, 1913:

The approval by the Secretary, October 9, 1913, of the plans for a proposed sewage treatment plant for the Boardman Centralized School, received from the W. J. Scholl Company, of Youngstown, September 9, 1913, subject to the following conditions:

1st. That direct ventilation through the septic tank, dosing chamber, and filters and main ventilation stack of the building shall be provided;

2nd. That the plans shall be revised to provide a filter area of at least 2,000 square feet and that this area shall be installed in the construction of the proposed plant;

3rd. That the septic tank shall be cleaned at intervals not greater than two months during the school year and the material properly disposed of by burial; and,

4th. That this approval shall be void unless the proposed sewage treatment plant shall have been installed in accordance with the foregoing conditions of approval prior to June 1, 1914.

The disapproval by the Secretary, November 14, 1913, of plans for a proposed sewage treatment plant for the residence of Mr. A. I. Bates at Irvington, near Dayton, received from Mr. Gustave A. Niehus, architect, October 8, 1913, and the advice that it would be unsafe to utilize any system of sewage disposal upon his property on account of the likelihood of the water supply obtained from the well 32′ deep being polluted; and that either a watertight cesspool with no outlet or a privy constructed in accordance with the Ohio Building Code should be used.

8th. The appointment of Miss Catherine McNamara, R. N., to the position of visiting nurse to accompany the public health exhibit, at a salary not to exceed $1,200 per year, to take effect December 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Sutton to approve the financial report, this being a statement of the expenditures from October 16th, to and including November 30, 1913, and a statement of balances available on December 1, 1913.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

Mr. Hill presented his report as Engineering Committee, and the matters were taken up in the following order.

It was moved by Dr. Miller and seconded by Mr. Hartzell to approve the detail plans for the development of a proposed new water supply for Akron, to be obtained from the Cuyahoga River at a point about 1.5 miles above Kent, purified by a plant of the gravity rapid sand type, and distributed through a reservoir about one-half mile east of the city, received from Mr. R. M. Pillmore, director of public service, November 13, 1913, subject to the following conditions:

1st. That a chemist, expert in the operation of water purification plants, shall be employed by the city to superintend and control the operation of the proposed plant; and that daily records of efficiency and operation shall be submitted to the State Board of Health at monthly intervals;

2nd. That samples of all grades of filtering material shall be submitted to and receive the approval of the State Board of Health before the material is placed; and,

3rd. That this approval shall be void unless the proposed new water supply shall have been developed in accordance with the above mentioned detail plans prior to June 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Brown and seconded by Dr. Grube to approve the plans for proposed additional sewerage and a temporary sewage treatment plant, received July 26th, August 25th, and November 19, 1913, from Messrs. Jennings, Lawrence and Lindsey, engineers for the village of Westerville, subject to the following conditions:

1st. That the proposed temporary sewage treatment plant shall be used for a period not to exceed three years before the expiration of which time a new sewage treatment plant for the entire village shall have been provided;

2nd. That the design of the proposed sewage treatment plant shall be revised by providing a dosing chamber of at least 1,200 gallons capacity;

3rd. That the existing secondary filters which will receive the dosing chamber discharge shall be reconstructed and provided with filtering material satisfactory to the engineer of the State Board of Health; and,

4th. That this approval shall be void unless the proposed additional sewerage and sewage treatment plant shall have been installed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Brown to approve the plans for a proposed water supply for Colonial Heights, Akron, an allotment of The Colonial Home Builders Company, received from Mr. J. W. Payne, consulting engineer, August 27, 1913, subject to the following conditions:

1st. That within a radius of 500 feet from the proposed supply well all dwellings shall be provided with sewer connections, no privy vaults or cesspools shall be established, and all sewers shall be constructed with watertight joints;

2nd. That the proposed supply shall be abandoned as soon as connection with the water distributing system of the city of Akron is made possible; and,

3rd. That this approval shall be void unless the proposed supply shall have been installed prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Mr. Hartzell, and seconded by Dr. Miller, to approve a proposed additional water supply for Alliance, to be obtained from drilled wells some 400 feet southeast of the waterworks pumping station, as shown on plans received from Mr. D. M. Armstrong, director of public service, October 23, 1913, subject to the following conditions:

1st. That provision, satisfactory to the State Board of Health, be made to prevent deterioration of the purified effluent of the water purification plant by admixture of the iron-bearing well water by one or both of the following methods:

(a) The installation of a deferrization plant to improve the quality of the proposed additional supply before it is discharged into the clear well.

(b) The installation of suitable valves, drains and suction lines to facilitate cleaning of the clear well.

2nd. That the proposed additional supply shall be used only at times when it is necessary to supplement the filtered supply; and that it shall be abandoned as soon as the water purification plant shall have been enlarged to a sufficient capacity; and,

3rd. That this approval shall be void unless the foregoing first condition shall have been complied with prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the city officials that in the opinion of the Board it would be preferable to increase the available water supply by providing additional filters or filtered water storage, or both, instead of utilizing the wells as proposed.

It was moved by Dr. Grube and seconded by Dr. Sutton to approve a proposed additional water supply for Barberton, to be obtained from two tubular wells, as shown on plans received November 20, 1913, from Mr. Elmer E. Boden, city solicitor, subject to the following conditions:

1st. That the well casings be extended to elevation 100 as shown on the plans submitted;

2nd. That the city council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, providing for the abandonment, cleaning, disinfection and filling of all leaching privy vaults within 500 feet of the proposed site for public supply wells; preventing the future establishment of any leaching privy vault or cesspool within that distance:

3rd. That no building other than for water works purposes shall be erected upon the proposed site;

4th. That all existing and future connections with industrial or manufacturing establishments, whereby polluted water may enter the distributing system, shall be provided with duplicate gate valves to be opened only for the purpose of supplying water to such establishments; and,

5th. That this approval shall be void unless the proposed additional water supply shall have been installed in accordance with the foregoing conditions prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Sutton to approve the site bounded by the State Road, Carter Avenue, Brady Avenue and Wolf Creek, as shown on a plan received November 20, 1913, from Mr. Elmer E. Boden, city solicitor, as a location for a new water supply for Barberton subject to the condition "That full detail plans for the complete development of the proposed site shall be submitted to the State Board of Health prior to June 1, 1914."

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Brown and seconded by Mr. Hartzell to approve the plans for proposed storm sewers for Beverly Place, Main Sewer District No. 3, Lucas County, received November 7, 1913, from Mr. William H. Gould, county sanitary engineer, subject to the following conditions:

1st. That the board of county commissioners of Lucas County shall control the establishment of connections to the proposed sewers and shall prevent the discharge of sewage or other objectionable wastes into them; and,

2nd. That this approval shall be void unless the proposed sewers shall have been installed prior to January 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Sutton to approve a general plan for proposed sewerage for Main Sewer District No. 2, Lucas County, received from Mr. William H. Gould, county sanitary engineer, October 23, 1913, subject to the following conditions:

1st. That before connections to the proposed system of sewers are permitted a process of treatment or disposal of the sewage, satisfactory to the State Board of Health, shall be provided; and,

2nd. That this approval shall be void unless plans for treatment or disposal of the sewage shall have been submitted prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Dr. Sutton to withhold approval of the contemplated plan of treatment of the sewage by tanks and contact filters at the site shown on the general plan of proposed sewerage, and to advise a connection with the contemplated intercepting sewer, treatment plant, or pumping station of the Ten Mile Creek sewer district of the city of Toledo for the disposal of the crude or clarified sewage from Main Sewer District No. 2.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Grube and seconded by Mr. Hartzell to approve the plans for a proposed water supply and water purification plant for the Lima State Hospital ,received October 15, 1913, from Mr. Frank L. Packard, architect for the board of commissioners, subject to the following conditions:

1st. That an existing privy vault on the bank of the proposed reservoir shall be abandoned and a method of disposal of the sewage from the dwelling and proposed water purification plant satisfactory to the

State Board of Health shall be provided; and that in the abandonment of the privy vault the contents and surrounding contaminated earth shall be removed and the excavation disinfected and filled with clean earth or ashes;

2nd. That prior to the installation of the proposed water supply, the board of commissioners shall take steps to prevent the drainage to Sugar Creek of wastes from existing and future oil wells on the watershed area of the stream;

3rd. That the proposed coagulation basin shall be increased in capacity to provide a satisfactory period of flow;

4th. That revised detail plans for the coagulation basin, filters, clear well and chemical devices shall be submitted to and receive the approval of the Engineer of the State Board of Health prior to the installation of the plant;

5th. That samples of the proposed filtering material shall be submitted to and approved by the Engineer of the State Board of Health before the material is placed; and,

6th. That this approval shall be void unless the proposed water supply and water purification plant shall have been installed in accordance with the foregoing conditions prior to January 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Brown and seconded by Mr. Hartzell to approve the plans for a proposed water supply for Kenmore, received August 27th, and October 15, 1913, from the Payne-Gillen Engineering Company of Akron and The Central Engineering Bureau of Chicago, engineers for the village, subject to the following conditions:

1st. That the village council shall provide for the abandonment, cleaning, disinfection and filling of all existing leaching privy vaults and cesspools within 1,000 feet of any public supply well, and shall prevent the future construction of leaching privy vaults and cesspools within that distance;

2nd. That the water works authorities, in co-operation with the health authorities of the village, shall inspect the territory within 1,000 feet of any public supply well at least once each month to maintain sanitary conditions within this area;

3rd. That in case dug wells are utilized detail plans of their construction, satisfactory to the engineer of the State Board of Health, shall be submitted prior to their installation; and,

4th. That this approval shall be void unless the proposed water supply shall have been installed prior to January 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary was instructed to advise the village council that it is of special importance to control the sanitary conditions on the property lying adjacent to and immediately north of the water works property, and that such control will be facilitated by lease or purchase of the said property.

It was moved by Dr. Sutton and seconded by Dr. Miller to approve the plans for a proposed water supply for Baltic, received October 3, 1913, from Mr. Seth Gerber, clerk of the board of trustees of public affairs, subject to the following conditions:

1st. That the village council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, to prevent the establishment of any privy vault, cesspool, or other source of pollution of the supply within 500 feet of the public water supply wells; and,

2nd. That this approval shall be void unless the proposed water supply shall have been installed prior to January 1, 1915.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Grube to approve the detail plans for a proposed new sewage treatment plant for Canton, received October 20, 1913, from Mr. R. Winthrop Pratt, consulting engineer, subject to the following conditions:

1st. That prior to the installation of the plant an additional area of at least ten acres adjoining the proposed site shall be purchased by the city to provide for future enlargement of the plant; and that the county road, forming the easterly boundary of the site, shall be relocated on a line east of the right-of-way of the Baltimore & Ohio Railroad;

2nd. That an office, laboratory, and workshop shall be provided and properly equipped at the site of the proposed plant to facilitate proper operation and control;

3rd. That samples of all grades of filtering material shall be submitted to and receive the approval of the Engineer of the State Board of Health before the material is placed; and,

4th. That this approval shall be void unless contracts for the installation of the proposed plant shall have been awarded prior to June 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Sutton to approve the plans for a proposed relief sewer for Fremont, received from Mr. C. A. Hochenedel, city engineer, October 18, 1913, subject to the following conditions:

1st. That the sewage of the city shall be collected and treated in a manner satisfactory to the State Board of Health when deemed necessary by said Board; and,

2nd. That this approval shall be void unless the proposed relief sewer shall have been installed prior to September 1, 1914.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Sutton to grant an extension of time until February 15, 1914, for the submission of complete plans for the abatement of the pollution of Swan Creek by the city of Toledo, as requested in a resolution of the city council adopted November 17, 1913, and received November 26, 1913; and to defer action on the plans for the abatement of the pollution of Ten Mile Creek, received November 20, 1913, from Mr. J. R. Cowell, director of public service, approval of which was requested by the city council in an action taken November 17, 1913, and received November 26, 1913.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Secretary was instructed to inform the authorities of the city of Toledo that action by the State Board of Health upon the above plans will be held in abeyance until a general plan of sewerage improvements for the entire city shall have been adopted by the council and submitted to the State Board of Health.

It was moved by Dr. Grube and seconded by Mr. Hartzell to approve a proposed additional water supply for Swanton to be obtained from a well 82 feet deep, located on Mechanic Street immediately north of George Street, as described in a communication received from Dr. Lewis C. Cosgrove, mayor, November 1, 1913, subject to the following conditions:

1st. That the existing and proposed additional water supply shall be utilized for fire protection purposes only and that no connections to the mains shall be made for any other purpose;

2nd. That the village council shall pass and file with the State Board of Health an ordinance providing for the removal of all existing domestic connections, and prohibiting future domestic connections to the distributing system, and that the mayor shall file with the Secretary of the State Board of Health an affidavit that all such existing connections have been removed;

3rd. That the village shall have a complete survey made of available sources of water supply of surface origin with the intention of ultimately installing a supply of satisfactory quality and quantity; and.

4th. That this approval shall become void January 1, 1916, before which time a permanent water supply shall have been provided.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Board took up the complaint of the trustees of Jennings Township, Putnam County, that the city of Delphos is discharging and permitting to be discharged sewage and other wastes into Jennings Creek, and by reason thereof, is so corrupting said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Jennings Township, Putnam County, Ohio, who reside in the vicinity of said creek.

The Board having before it the report of its engineering department upon an investigation of the complaint, it was moved by Dr. Brown and seconded by Mr. Hartzell that the Board find from said report that Jennings Creek at and below the outlet of the sewerage system of the city of Delphos is seriously polluted by the discharge of improperly treated sewage and that conditions are thereby caused which are detrimental to the health and comfort of the citizens of Jennings Township, Putnam County, Ohio.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was then moved by Dr. Brown and seconded by Mr. Hartzell that the Secretary be instructed to notify the authorities of Delphos of the Board's findings, and to state that the Board has fixed 8 p. m., Wednesday, the 21st day of January, 1914, at the office of the Secretary, in Columbus, as the time and place, when and where the city of Delphos may have an opportunity to be heard and to show cause, if any exists, why the said city should not be required to install a new sewage treatment plant prior to June 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Board took up the complaint of the board of health of Vermilion that the village of Vermilion is discharging and permitting to be discharged, sewage and other wastes into open ditches draining into Vermilion River and Lake Erie and by reason thereof, is so corrupting said ditches, river and lake, as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Vermilion, Erie County, Ohio, who reside in the vicinity of said ditches, river and lake.

The Board having before it the report of its chief engineer upon his investigation of this complaint, it was moved by Dr. Miller and seconded by Dr. Brown that the Board find from said report that watercourses tributary to the Vermilion River and Lake Erie within the village of Vermilion are polluted by sewage from the village and that conditions are thereby created that are detrimental to the health and comfort of the citizens of Vermilion.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

It was moved by Dr. Miller and seconded by Dr. Brown that the Secretary be instructed to notify the authorities of Vermilion of the Board's findings and to state that the Board has fixed 8. p. m., Wednesday, the 21st day of January, 1914, at the office of the Secretary, in Columbus, as the time and place, when and where, the village of Vermilion may have an opportunity to be heard and to show cause, if any exists, why the said village should not be required to install sewerage and sewage treatment works prior to June 1, 1915.

The roll call upon the adoption of this motion resulted as follows: Yeas, Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown. Nays, none.

The Secretary presented a communication from the council of the city of Greenville, under date of November 15, 1913, asking the State Board of Health to appoint a referee engineer in the matter of sewage disposal, to act in conjunction with the engineer appointed by the council.

It was moved by Dr. Brown and seconded by Dr. Miller that the Secretary be instructed to refer the matter to the Attorney General.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented a list of health officers, who had been appointed by their respective councils to serve in lieu of a board of health.

It was moved by Mr. Hill and seconded by Dr. Brown that these health officers be approved.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the application of Marie Raglin to conduct a maternity boarding house and lying-in hospital at 1369 Clifton Avenue, Columbus, providing for the care of three women or six children.

It was moved by Mr. Hill and seconded by Dr. Sutton to grant this license.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the following applications for a renewal of their licenses to conduct a maternity boarding house and lying-in hospital:

Evangeline Reams, at 73 North Harris Avenue, Columbus, providing for the care of ten women and ten children.

Mrs. Zella Briggamann, at 1432 East Rich Street, Columbus, providing for the care of ten women and ten children.

Mrs. Anna Lienesch, at 2703 Colerain Avenue, Cincinnati, providing for the care of two children.

It was moved by Mr. Hill and seconded by Dr. Sutton to grant to these applicants a renewal of their licenses.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the applications of Miss Minnie Van and Miss Hettie Harlan Clifton, of Steubenville, for the position of visiting nurse in Jefferson County, to be employed by the county commissioners.

It was moved by Dr. Miller and seconded by Dr. Brown to approve the appointment of Miss Van and Miss Clifton as visiting nurses for Jefferson County, in accordance with Section 3153-1 of General Code.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the application of Miss Bertha R. Fudge, of Eaton, Ohio, for the position of visiting nurse in Preble County, to be employed by the county commissioners.

It was moved by Dr. Miller and seconded by Dr. Brown, to approve the appointment of Miss Fudge as a visiting nurse for Preble County, in accordance with Section 3153-1 of the General Code.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

It was moved by Mr. Hill and seconded by Dr. Sutton that the Board extend to Dr. Hasencamp its appreciation of his services during his term as president and thank him for his uniform fairness in handling matters coming before the Board.

The Secretary called the attention of the Board to the International Exposition of Safety and Sanitation to be held in New York, December 11-20, 1913, under the auspices of the American Museum of Safety, and recommended that the Board send Dr. Emery R. Hayhurst, chief of the Survey of Occupational Diseases, as a delegate to this exposition.

It was moved by Dr. Sutton and seconded by Dr. Brown that Dr. Hayhurst be sent to the International Exposition of Safety and Sanitation.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the following communication from the Columbus Dental Society.

"COLUMBUS, OHIO, October 28, 1913.

DR. E. F. McCAMPBELL, *Secretary, The Ohio State Board of Health,*
Columbus, Ohio.

DEAR DOCTOR: — At the last meeting of the Columbus Dental Society, September 30th, the following resolution was unanimously passed and the Corresponding Secretary was instructed to send copy to you:

"WHEREAS, The Ohio State Board of Health is vigorously and systematically conducting a Public Health Educational campaign and is officially recognizing, through its Exhibit, lectures and monthly bulletin, the direct relation of the mouth and teeth to health and disease; therefore, be it

Resolved, That the Columbus Dental Society officially commends the State Board of Health in this new field of work and expresses its gratification that the dental side of the health question is receiving its rightful recognition; and, be it further

Resolved, That we express our appreciation of having a member of our society as a member of the Ohio State Board of Health and pledge our loyal support to all the health policies advocated by the said board."

Respectfully submitted,

EDWARD E. HALL,
Corresponding Secretary,
The Columbus Dental Society."

It was moved by Dr. Miller and seconded by Mr. Hartzell that this communication be entered upon the minutes.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Sutton, Miller and Brown.

In the negative, none.

The Secretary presented the resignation of Miss Helen O'Connor as general clerk, to take effect November 22, 1913.

On motion of Dr. Sutton, seconded by Dr. Brown, the resignation of Miss O'Connor was accepted with regret.

The election of officers for the ensuing year was taken up.

Mr. Hartzell, who, to follow the precedent adopted by the Board, would have succeeded Dr. Hasencamp as president, asked that he be not considered for that office, because of physicial inability to fully perform the arduous duties of the office, and for the further reason that he expected to be out of the country for a good part of the coming year.

Dr. Sutton nominated Mr. Hill to succeed Dr. Hasencamp as president.

This motion was seconded by Dr. Miller.

It was then moved that the nomination be closed and that the Secretary call the roll for the election of Mr. Hill.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Sutton, Miller and Brown. Mr. Hill not voting.

Dr. Miller nominated Dr. Sutton as Vice-President. This motion was seconded by Mr. Hill.

It was moved that the nomination for Vice-President be closed and that the Secretary call the roll for the election of Dr. Sutton.

Those voting in the affirmative were Messrs. Hasencamp, Hartzell, Grube, Hill, Miller and Brown. Dr. Sutton not voting.

The Board then adjourned to meet in Columbus, January 21, 1914.

Attest: E. F. McCampbell, M. D.,
Secretary.

Approved January 21, 1914.

RESUME OF REPORTS PRESENTED TO THE BOARD BY THE SECRETARY.

JANUARY MEETING.

(The part of this report referring to work done in 1912 was published in the 1912 Annual Report.)

Attention is called to the seemingly great interest which has developed throughout the state in the public health movement. It is to be noted that health officers and local boards of health are showing increased activity. This is evinced by the correspondence and newspaper clippings that are received at the office of the Secretary.

Attention is also directed to the attitude of Governor Cox on the conservation of public health. At the Governor's request, your Secretary provided him with certain information as to improvements in the existing health laws of the state, and certain data in regard to public health legislation. Two conferences were held with the Governor at Dayton before his inauguration, and he has seen fit in his message recently sent to the General Assembly to advocate the passage of the appropriation of $25,000 for the creation of a Division of Tuberculosis, and also the establishment of a Survey of Occupational Diseases. In addition to the two conferences referred to above, the President, Dr. Hasencamp, the chairman of the Finance Committee, Dr. Sutton, and the Secretary met with similar committees from other allied boards in the state, at the Algonquin Hotel, Dayton, December 26th, for the purpose of considering general public health legislation. As a result of this conference definite recommendations were formulated and presented to the Governor. Governor Cox also addressed this conference, making very plain his attitude on public health matters.

Your attention is also directed to the fact that the Governor will make an address before the conference of State and municipal boards of health, on Thursday, January 23rd.

Your Secretary would also recommend that the Board assume a more aggressive policy in regard to the appointment of health officers, and their failure to report communicable diseases, and the enforcement of orders issued under the Bense Act; and should your honorable body see fit to concur in this recommendation, your Secretary will transmit definite recommendations for the appointment of health officers in localities which fail or refuse to appoint such officers, as well as recommendations as to prosecutions for disregarding the orders of the Board under the Bense Act and requiring reports of communicable diseases.

It having been established that the common drinking cup and roller towel are a distinct menace to the public health, and inasmuch as the Treasury Department of the United States has seen fit to abolish the drinking cup and roller towel on all common carriers, engaged in interstate traffic, your Secretary recommends that the Board adopt regulations in regard to the same.

The State Commission for the Blind has made a request that Ophthalmia neonatorum be made a reportable disease. It seems that some time ago the Board gave the Commission to understand that after trying to secure these reports in some of the larger cities the plan appeared to be feasible. Your Secretary, therefore, hereby recommends that the Board make ophthalmia neonatorum a reportable disease.

On the evening of January 15th, the Secretary met with the State Commission for the Blind and a committee from the Ohio State Medical Association, at the State School for the Blind, to discuss improvements in legislation for the prevention of blindness.

Recommendations were here made which appear in the minutes of the January meeting.

The Secretary is especially anxious to build up a public health exhibit which can be transported to various parts of the state for instruction to the general public. Appropriate models may be accumulated from time to time, together with charts, and eventually a satisfactory exhibit will be formulated. In this connection it is recommended that "A Farm Yard Well Model" be purchased.

The President appointed Mr. Hill a special committee to attend the conference held in Buffalo, N. Y., December 17th, 1912, of officials of Canada and the United States relative to the pollution of the international waterways between the two countries. Mr. Hill attended the meeting and a copy of his report has been furnished the members of the Board.

December 30th, 1912, the bacteriologist, Dr. Brown, attended a meeting of the American Association for the Advancement of Science, held in Cleveland.

January 9th, Dr. Brown addressed a meeting of the Darke County Medical Society, held in Greenville, upon the subject of "Epidemic Sore Throat".

At the annual meeting of the State Board of Agriculture, held in the Chamber of Commerce in Columbus, the Secretary addressed the meeting on January 14th upon the subject of "The Human Health View of Tuberculosis of Animals". The session was termed "Live Stock Rally Day" and the papers and discussions were devoted to that phase of the Board's work.

On the evening of January 14th, the Secretary addressed the council of the city of Marion on the subject of appropriations for the organization of the health department; and on the same same evening met with the board of health in regard to the formulating of a sanitary code for Marion.

January 16th, the chief engineer addressed the Ohio State Waterworks Association, which includes in its membership officials of private water companies within the state. The subject of his paper was "The Value of a Pure Water Supply".

COMMUNICABLE DISEASES.

The tables giving the cases of communicable diseases will be found in the report of the statistician.

Cerebro-Spinal Meningitis.

January 7th, at the request of Mr. Hill and the health officer of Cincinnati, Dr. Boudreau, the epidemiologist, visited that city to investigate cases of cerebro-spinal meningitis. There were four cases, two of which died. The source of infection was thought to be from a case in Kentucky. All houses and exposures were quarantined. The school and motion picture hall which had been visited by one of the cases were closed and disinfected.

Smallpox.

Dr. D. F. Banker, one of our medical inspectors, was sent to Fairfield Township, Columbiana County, to investigate an outbreak of smallpox, at the expense of the local authorities.

Dr. Sutton was called upon in consultation in several cases in Zanesville.

Bense Propositions.

Greenville was visited by one of the engineering department to inspect sewerage conditions, and learn what had been done, if anything, to comply with the Board's order of January 4, 1909, to install sewage treatment works. A report of the findings has been prepared for consideration at this meeting. Reports have also been prepared for consideration on the public water supply of Bellaire, and its failure to comply with the order issued December 6, 1910; and upon an investigation of the pollution of the Sandusky River by the sewage of Bucyrus, which city has failed to comply with the Board's order of December 6, 1910.

One of the engineers visited Paulding, December 11, 1912, to investigate the pollution of Flat Rock Creek by the German American Sugar Company, of which complaint was made. Last year when an investigation was made the plant was not operating and it was not possible to determine the extent of the pollution.

One of the engineers visited Cambridge December 20th, 1912, to investigate the complaint of the pollution of Wills Creek by wastes from the American Sheet Tin Company.

Proposed and Additional Water Supplies.

The engineering department has investigated the proposed water supply for the Lima State Hospital and for additional water supply for Swanton, and reports have been prepared for consideration at this meeting on proposed supplies for Kenton, the Ohio State Sanatorium, Swanton and water purification for Woodsfield.

Existing Water Supplies.

The existing water supply has been inspected at Andover, Defiance, Dayton, Eaton, Greenville, Napoleon, Port Clinton, Rossford, Springfield, Toledo, Xenia, and the water purification plant at Conneaut.

Proposed Sewerage and Sewage Treatment Works.

One of the engineering department inspected the location for proposed sewage treatment works for Bexley (a suburb of Columbus), sewerage and sewage treatment works for Mantua; sewerage improvements proposed at Cincinnati, and proposed sewer and works for a school at South Euclid.

Reports have been prepared for consideration at this meeting on Bexley, Celina, Mantua, the necessity for sewerage for district No. 3, Lucas County, the installation of a temporary sewer outlet for Kennedy Heights and Pleasant Ridge (Cincinnati), and the extension of the time limit of the Board's approval of sanitary sewers for Arlington Heights.

The director of public service of Athens notified the Board that council has abandoned the sewerage project, plans for which were approved by the Board September 12, 1912.

On December 28, 1912, the chief engineer disapproved plans and specifications for a proposed sewer and septic tank for a township school house at South Euclid, submitted by Mr. James A. Morlock, member of the board of education of Euclid Township, Cuyahoga County, December 9th, 1912, as they did not provide for a proper method of treatment of the sewage. The board was advised that revised plans for a more suitable type of plant. giving a high degree of purification. should be approved.

December 14th, 1912, the chief engineer approved the filtering material submitted by The Wm. B. Scaife and Sons Company of Pittsburg, for the Provident Coal Company, in compliance with Condition 1, of the Board's approval of October 23rd, 1912, of proposed water supply for the plant of said company located near St. Clairsville.

In compliance with the first condition of the Board's approval of August 15th, 1912, of the proposed water supply for the New Concord Real Estate Company, a test has been made which indicates that the quantity of water available is sufficient for the present needs of the village, and that the quality is satisfactory. The bacterial findings were somewhat unfavorable, due no doubt to the newness of the installation.

Existing Sewerage and Sewage Treatment Works.

The recently completed sewage treatment works at *Andover* were found to have been completed in a proper manner but the excessive leakage of ground water into the sewers continues. It is of the utmost importance that this leakage be eliminated, and the mayor and council were advised to employ an engineer to examine the sewerage system and devise a remedy. Council adopted a resolution advising the property owners to connect with the sewers.

In December 1912 Dr. Miller and one of the Engineers visited *Lakewood* to investigate sewerage conditions. The inspection along the lake front showed that twenty-five or thirty private sewers discharge sewage from residences directly into the lake. Owing to the topographical conditions along the shore, it was impossible to make a close examination of the lake for the purpose of learning wheather any visible pollution was caused. The authorities were advised that the city should provide proper sewerage for these residences and prevent the maintenance of the private outlets.

The sewage treatment work were examined and found to be sesiously overworked by the large volume of sewage contributed by the city. The plant was constructed when the population of the city was considerably less than at present and the greatly increased sewage flow is in excess of what the plant can be expected to treat. The presence of the water works intake of Rocky River a short distance below the outlet from the works makes necessary efficient operation of the plant. The authorities were advised to take up immediately the question of employing a sanitary engineer to recommend improvements.

Investigation of the storm sewers of the city showed that they are misused to a large extent to receive domestic sewage, which should be discharged into the sanitary sewers. Council was advised that this practice should be prohibited by ordinance.

A recent examination of the sewage treatment plant at the *Ohio State Sanatorium*, near Mt. Vernon, revealed the fact that three of the filters had been cleaned and furrowed and the fourth was being cleaned. The sludge bed contained no filtering material, rendering it impossible to remove sludge from the septic tanks. The tanks themselves were badly in need of cleaning and their poor efficiency has doubtless contributed to the failure of the filters to operate properly. The superintendent was informed that it was of the utmost importance that the sludge bed be filled with proper filtering material and the tanks be thoroughly cleaned. It was also observed that the bleach used in disinfecting the sewage effluent is obtained in large barrels. The superintendent was advised that the strength of the chemical is partly spent before use and that the bleach should be purchased in five or ten pound sealed cans so that the chemical applied may be of standard strength. The superintendent of the institution subsequently advised the Secretary that the improvements recommended had been made and that the plant is again operating in a proper manner.

Waste Disposal.

In December the health officer of *London* and representatives of the stockholders of a proposed creamery to be located at that village, visited the engineering department for the purpose of conferring with the engineers relative to the proper disposal of the wastes from the plant. It was originally intended to discharge the wastes into Oak Run, a small stream passing through the western portion of the village, but the flow of this stream during the summer months is so small that a nuisance would be created. Permission to connect with the village sewers had been refused. It is estimated that the total quantity of wastes will be 3000 gallons per day, consisting largely of can and floor washings and the liquid wastes resulting from the butter making process. The representatives were informed that before any works are installed for treating the wastes it will be necessary to submit plans and specifications to the State Board of Health for approval.

Sanitary Conditions.

A representative of the engineering department recently made an inspection of the sanitary conditions at *Kenton*. He learned that the local board of health is inactive and that inefficient inspection of sanitary conditions is being maintained. The importance of having an active board of health, and that it be given the assistance of a sanitary policeman to detect and abate unsanitary conditions was urged upon council. Attention was also called to the necessity of providing means for the collection and disposal of the various wastes in order to maintain good health conditions.

Complaint was made to the Board of a nuisance in *New Concord* caused by a sewer. While in New Concord, one of the engineers made an investigation and found that a storm sewer extending south-west from Main Street to an outlet near the B. & O. railroad was being used to receive domestic sewage. The complaint had been referred to the health officr, and the mayor and council were advised to pass an ordinance to prevent the improper use of the storm sewers.

State Inspector of Plumbing.

Eleven inspections were made by the State Inspector of Plumbing, in Bradford, Bucyrus, Dayton, Lima, Marion, and Newark, which makes the total number of inspections during the year 301.

Orders were issued for necessary changes in plumbing installed in a school building at Newark; and plans for plumbing in a wing of the Cleveland State Hospital were examined.

Letters were sent to thirty cities advising the board of health to appoint a plumbing inspector. Communications have been received from Conneaut, Fostoria and Salem, stating that such inspector has been appointed, and the authorities of Bellefontaine, Elyria, Hamilton and Mansfield asked for further information. All the cities were furnished with a draft of an ordinance and a letter explaining the necessary procedure. Twenty-two of the thirty cities failed to reply.

The State Plumbing Inspector has also furnished the Secretary with a synopsis of the joint conference held at the Public Service Commission's hearing room, January 2nd, 3rd, and 4th in regard to the necessity of revising various sections of the State Plumbing Code.

In response to a request for an interpretation of Sections 126-277 of Part 4 of the General Code of Ohio, the Attorney General held that the State Board of Health, building inspector, commissioner or health departments of municipalities having building or health departments, when acting in conjunction, may approve some proposed device, fixture or construction, which they may find answers to all intents and purposes the fixture, device or construction specified in the Code under Part 4.

Since my last report there have been forty-one inspections made by a representative of the Board, and twenty-five different places have been visited.

FEBRUARY MEETING.

The Secretary has devoted considerable time during the past month looking after legislative matters. Several bills have been drawn up on public health measures at the request of various members of the General Assembly. A bill providing for the sterilization of habitual criminals and defectives has been introduced, as well as one requiring compulsory medical and dental inspection of school children. A bill has also been introduced giving the State Board of Health power to remove local health officers for non-performance of their duties.

At the request of the Executive Department of the State, the Secretary has been sitting with the public health committee of the House of Representatives in order to keep in touch with the various measures that have been introduced which have to do with public health.

The Secretary wishes to report that House Joint Resolution No. 12, providing for a survey of occupational diseases has passed both branches of the General Assembly. This resolution directs the Finance Committee to appropriate $7000. for 1913. and a like sum for 1914 for this work.

On January 20th the Secretary held a conference with President W. O. Thompson, of the Ohio State University, and Dr. A. F. Shepard of the State Board of Administration, to discuss the advisability of establishing on the grounds of the Ohio State University, a laboratory for the purpose of doing all the laboratory work of the state, and for manufacturing certain drugs for various state institutions. Investigation has shown that large sums of money are spent yearly by the State Dairy and Food Commissioner and the State Board of Agriculture for analytical work. It was thought possible that the State Board of Health laboratories could be combined with such chemical laboratories as might handle the above mentioned work. No conclusions were reached but the State Board of Administration will make further investigation and report later.

January 21st the Secretary held a conference with representatives of the State Board of Embalmers and representatives of the State Undertakers' Association, to discuss a bill having for its purpose the regulating of the practice of embalming in this State.

February 10th the Secretary spoke at an open hearing in the Senate Chamber on the necessity of adequate dairy inspection in this state.

January 21st the Chief Engineer addressed a meeting of High School teachers at Marion upon the subject of "Certain Facts In The Field of Sanitary Engineering Which Teachers and Pupils Should Know".

February 2nd, Dr. Hagner, medical inspector, upon request of Mr. Hill, went to Columbia Township, Hamilton County, to investigate cases reported as "Cuban Itch". Dr. Hagner found a negro family of nine persons, living in a squalid two-room cabin. Two weeks before a sixteen months old baby had died in convulsions which the attending physician stated followed a purulent discharge from the nose. The exact cause of death he was unable to state. Another child of three years died in convulsions following what is supposed to have been bronchitis, the child not having been under the care of a physician. An investigation was made by the coroner who found four children, 6, 7, 8, and 11 years of age, and the parents afflicted with scabies, and consequent eczema to a marked degree. Our inspector advised that the children be taken to the hospital and that the attention of the health officer of the township be called to this matter, so that he might take such measures as seemed to him expedient.

February 12th the epidemiologist visited Smithville, Wayne County, where he found one case of smallpox, the origin of which could not be definitely traced. There had been a number of exposures, all of whom were willing to be vaccinated, and this was done.

January 27th, the epidemiologist was sent to Grove City and Jackson Township, Franklin County, to investigate an outbreak of scarlet fever. His report may be found on a subsequent page.

January 19th, upon request of the health officer, the epidemiologist visited Newton Township, Muskingum County, to investigate an outbreak of smallpox and chickenpox. His report may be found on a subsequent page.

January 29th, in compliance with the request of the health officer, the epidemiologist visited Cambridge to investigate an outbreak of smallpox. His report may be found on a subsequent page.

February 13th, the epidemiologist visited Springfield, Lafayette and London, to investigate the prevalence of smallpox along the lines of the Ohio Electric Railway. His report may be found on a subsequent page.

Proposed Water Supplies.

Jackson, Pleasant City and Wooster were visited by a representative of the engineering department relative to a proposed or additional water supply.

January 16th a representative of the engineering department visited Pleasant City and collected a sample from a test well drilled preliminary to the installation of a public water supply. The analytical results in a general way indicated that the water is not satisfactory as a public supply. Its high bacterial content and excessive iron content are unfavorable, but in view of the inadequacy of the pumping these constituents cannot be taken as a means of condemning the water. The authorities were advised that before the Board would consider any water supply for the village it must be thoroughly exploited to learn both the available quantity and quality.

Existing Water Supplies and Purification Plants.

The existing water supply was inspected at Akron, Dayton, Eaton, Greenville, Painesville, Port Clinton, Sandusky, Springfield, Wellston and Xenia.

A recent examination of the existing water purification plant at Conneaut indicated that the filters were producing a water of satisfactory quality at the time of sampling. The lake water was rather turbid and carried some organic pollution. The filtered water was clear and apparently well purified. The attention of the authorities and of the Conneaut Water Company was called to the fact that in April 1912, the Board withheld approval of plans for the enlargement of the plant as they failed to show certain details. In spite of this fact the company installed the enlargement according to the plans and the plant is now being operated in violation of the law. They were advised to have prepared and submitted to the Board detailed plans for these devices. Owing to the failure of the company to submit such plans a report will be submitted to the Board for its action at this meeting.

January 8th a representative of the engineering department visited Dayton to inspect the progress of installation of the additional water supply. Analyses of samples of the present supply indicated a water of satisfactory quality from a sanitary standpoint. Rapid progress is being made in the installation and the supply will be ready for use during the summer of 1913. The authorities were reminded of the conditions of approval requiring the passage of an ordinance by council to protect the wells by preventing the establishment of any source of pollution within 1000 feet of any well, and such ordinance has since been filed with the Secretary, having been passed August 30, 1912.

January 14th a representative of the engineering department visited Painesville to examine the public water supply. Samples were collected from Lake Erie, from the pump well and from two points on the distribution system. Analyses of these indicated that the water is dangerous in its raw state for domestic use. It would appear that the supply consists of a mixture of water obtained from ground sources and from the lake. It was learned that the city had furnished approximately one-third million gallons of water to the Lake Shore Railroad from November 26th, 1912, to January 1913. The infiltration system was unable to furnish this excess pumpage of water and the supply was drawn in part from Lake Erie direct, but on account of complaints from citizens this practice was discontinued. In view of the inadequate quantity of water obtainable by present methods and its unsatisfactory quality the utmost importance of securing an improved supply was pointed out to the mayor and council and they were urged to employ a competent engineer to advise the city as to the proper procedure.

January 7th, 1913, a representative of the engineering department examined the water supply of Rossford, Wood County, installed illegally, inasmuch as the plans were not submitted to the Board for approval. The supply is obtained from drilled wells but at certain times the Maumee River furnishes an auxiliary supply. The water from the wells was found, upon analysis, to be of satisfactory quality from a sanitary standpoint and safe for domestic consumption. A sample taken from the distribution system, however, showed excessive pollution, due no doubt to the admixture of river water. The company was advised that the Board will require that an improved water supply be provided for the community and in case the river water is utilized that provision should be made for its purification. They replied that plans are being prepared for improvement in the water supply of Rossford. It was also stated that steps would be taken to improve sewerage conditions.

January 6th, a representative of the engineering department examined the public water supply of Springfield. Analyses of samples collected were not entirely satisfactory. While not extremely polluted the bacterial count pointed to the likelihood of a contaminating influence. Previous examinations have indicated that the procedure of augmenting the supply by flooding the land north of the pumping station with water from Buck Creek is attended by the danger of polluting the supply drawn from the pump well. In 1912 the Board disapproved of the general project of natural filtration of the creek water in this manner, but at the time of the recent examination it was learned that this practice has been intermittently employed. Owing to the rapidly increasing consumption the natural ground water has been found inadequate to supply the city at all times, and it is therefore necessary, especially during the summer months, to increase the available supply. The attention of the director of public service was called to the great importance of having a plentiful water supply of satisfactory quality, and inasmuch as the present conditions are serious, he was urged to have the city immediately employ a water supply expert to study all available sources and recommend the most suitable procedure to be followed in obtaining a satisfactory supply.

January 7th a representative of the engineering department examined the public water supply of Xenia and samples of the water have been examined. The supply is obtained from drilled wells in the southerly portion of the city, and from springs northeast of the city. The reservoirs receiving the flow from the springs also receive the runoff from a small area. The superintendent of the water company was advised to at once take steps to eliminate the surface drainage reaching the collecting reservoir at the spring supply and to maintain a strict protection of the supply.

Existing Sewerage and Sewage Treatment.

January 7th a representative of the engineering department examined the existing sewage treatment works at Xenia, which were found to be in an exceedingly rundown condition and seriously overburdened by the sewage flow from the city. It appears almost impossible to repair the works to operate them satisfactorily. The small stream receiving the sewage is seriously polluted during dry weather. The attention of the mayor and council was called to the importance of improving conditions and they were urged to take the matter up for consideration. They referred the matter to the city solicitor, who replied to the Secretary that council and the city officials desired to make improvements but their great difficulty was a lack of funds.

Dayton, Greenville, Springfield, Toledo, Wellston and Xenia were visited and the sewerage inspected.

In Toledo the sewerage conditions at the plants of the International Stock Yards, and the Toledo Sugar Company's plant, were inspected.

The Sewage treatment plant at Eaton was also examined.

Bense Propositions.

February 3rd the Secretary and the Chief Engineer gave representatives of the cities of Bellaire and Bucyrus a hearing and a statement is being prepared for the consideration of the Board at this meeting.

On request of the Attorney General, the order against the city of Ironton, which was held by Governor Harmon, is being amended and will be presented to the Board for action.

The authorities at Shelby have submitted plans for reconstruction of the sewage treatment works of that city, in compliance with the order issued under the Bense Act, and the report has been prepared upon these plans for consideration by the Board.

A report has also been prepared for consideration, upon the pollution of Flat Rock Creek in Emerald Township, Paulding County, by the German American Sugar Company of Paulding.

February 11th the President and the Chief Engineer, as a committee, investigated the pollution of Ten Mile and Swan creeks at Toledo.

February 12th the Chief Engineer visited Fostoria to advise the city officials regarding proposed improvements in the sewage treatment works and the water supply of that city.

February 13th the Chief Engineer investigated the complaint that the sewage of Lakewood is polluting Rocky River. He later conferred with Dr. Miller, the other member of the committee appointed to make this investigation, relative to the investigation and a report upon the same. This report will be presented for consideration at this meeting.

The Secretary has been notified that a petition has been presented to the Common Pleas Court of Muskingum County asking for a restraining order against the issuing of bonds for improvement in the public water supply of Zanesville until the matter has been submitted to a vote under an initiative and referendum petition.

A report has been prepared by the engineering department upon an investigation of the pollution of Wills Creek by the wastes from the American Sheet and Tin Plate Company at Cambridge, made pursuant to a complaint from the trustees of Cambridge Township, Guernsey County, in 1911.

The investigation revealed the fact that while wastes are discharged from both plants of the company into Wills Creek and these wastes are undoubtedly detrimental to the quality of the water of the creek, the pollution is not sufficient to warrant action by the State Board of Health. Further investigation will be made when the flow of the stream is low to determine whether or not the complaint is justifiable. A report on sewerage conditions will be considered at this meeting.

February 15th a petition was received from the health officer of Caldwell, asking the Board to investigate the public water supply of that village and to require the removal of all sources of pollution affecting the supply.

State Inspection of Plumbing.

Since the last report the State Inspector of Plumbing has made two inspections in Tiffin and three in Newark. Fees to the amount of $20 were returned by the inspector, as the greater part of his time has had to be spent in the work on that part of the State Building Code relating to plumbing.

The Secretary has reviewed the report and receipts of the inspector for the month of January, and finds that collections were made to the amount of $25.00. Certificates of approval have been issued to the owners of buildings in Tiffin, Newark, Lima and Martins Ferry. Plans were reviewed for a large building in Mansfield and for a school at West Carrollton; and orders have been issued to the owners of buildings for necessary changes in plumbing installed in buildings in Marion and Newark.

Forty inspections have been made by a representative of the Board, and twenty-five different places visited.

MARCH MEETING.

On February 25th the President and Secretary attended a meeting of the conference on health and public instruction of the American Medical Association at Chicago. The conference was conducted under the presidency of Dr. H. B. Favill. Representatives from various states presented reports relative to medical and public health legislation being considered by the respective legislatures.

Dr. Ben R. McClellan of Xenia, and the Secretary gave a resumé of the bills dealing with public health and medical matters before the Ohio General Assembly.

Representatives of special committees were heard on the subject of railway sanitation; revision of the model law on vital statistics; expert testimony and conservation of vision. The subject of medical school inspection was discussed by Dr. E. B. Hoag, and Mr. A. C. Umbreit, attorney for the Wisconsin State Board of Medical Examiners, discussed the subject of state police power and the practice of medicine.

At the afternoon session Dr. Cressy L. Wilbur of Washington D. C., gave a paper on the progress in vital statistics legislation in the United States; Dr. Mark W. Richardson, secretary of the State Board of Health of Massachusetts, read a paper on ophthalmia neonatorum in Massachusetts; Professor E. O. Jordan of the University of Chicago, discussed the subject of municipal regulation of the milk supply. The discussion of this paper was opened by Assistant Surgeon General, J. W. Kerr, of the U. S. Public Health Service. Dr. W. B. Cannon, professor of physiology at Harvard University, read a paper on the subject of anti-vivisection agitation and the forces behind it. Several other papers of minor importance were presented.

Since monthly report there has been some progress in the public health legislation before the General Assembly. The partial appropriation bill for 1913, carrying the increase in the various appropriations for salaries of the employes of the Board passed both houses and has been signed by the Governor. The general appropriation bill for the years 1913-1914 has just been introduced in the House of Representatives. This bill carries appropriations for 1913-14 to be added to the amount carried in the partial appropriation bill for 1913-14. Two special items of importance are included in this bill: namely, $25,000 for the establishment of a Bureau of Tuberculosis, and $7,000 for the Survey of Occupational Diseases for the appropriation year.

The Secretary has appeared before the finance committee and assurances have been made by this committee, as well as by the Governor, that these appropriations will be granted.

The bill introduced by Representative King, of Ashtabula County, calling for compulsory medical and dental inspection of school children, has passed the House of Representatives with some slight modifications and is now in the Senate. Also the bill by Representative King, providing for district nurses for tuberculosis cases. The same is true of a bill introduced by Representative Sweeney of Cuyahoga County, prohibiting the advertising of cures for tuberculosis, cancer, and sexual diseases.

On March 5th, upon request of the Governor, the Secretary met with the physician members of the General Assembly at the Governor's residence for the purpose of discussing the various bills dealing with medical matters and public health. At this conference the Governor agreed to use all possible influence to put through the various measures.

The bill introduced by Representative Cowan, of Putnam County, providing for the sterilization of defectives and criminals, was defeated in the House.

The bill introduced by Representative Thomas, of Wood County, providing for reporting of occupational diseases to the State Board of Health, has passed the House and is now in the Senate.

During the coming week three public health bills of importance will be considered by the House of Representatives: namely, the bill by Representative Jenkins, of Madison County, giving the State Board of Health power to remove incompetent health officers; the bill by Representative King, providing for district hospitals for tuberculosis; and the bill by Representative Thomas, giving the State Board of Health, or its employes, the power to enter upon private property for the purpose of making an investigation of sanitary conditions.

The bill introduced by Representative Chapman, of Montgomery

County, providing for additional plumbing inspectors, was defeated in the House by a close vote, and on being reconsidered was again defeated.

Antitoxin.

On March 14th, the Secretary finally signed the agreement submitted by the H. K. Mulford Company, providing for the distribution of antitoxin under the patronage of the State Board of Health. Some difficulty was experienced in getting the company to state in this agreement in very definite terms what they proposed to do so far as the distribution of antitoxin was concerned among those who could not be classified as indigent. The matter has now been satisfactorily adjusted so that antitoxin can be secured from the druggist on representation of the attending physician that the patient is unable to pay the regular list price. As previously stated, this amounts to a reduction in price of antitoxin for practically all of the citizens of this state. March 14th the Secretary visited the laboratories of the H. K. Mulford Company in Philadelphia, for the purpose of inspecting the plant and closing the agreement with the officers of the company.

The Secretary has taken up the matter of providing for the organization of the Division of Occupational Diseases and the Division of Tuberculosis, and is desirous, if possible, that we put this survey in operation, as well as the Division of Tuberculosis on or about May 1st. At the meeting to be held on March 20th, the Secretary will make a brief report as to the progress being made towards the organization of these two divisions.

February 27th, in compliance with the request of the health officer, the epidemiologist visited Zanesville to investigate an outbreak of scarlet fever. His report may be found on a subsequent page.

There were a number of inspections made on account of smallpox. February 12th, the epidemiologist visited Green Township, Wayne County, to investigate an alleged case of smallpox. His report may be found on a subsequent page.

February 17th, Dr. James G. Cullen, of Toledo, investigated an outbreak of smallpox at Curtice, Allen Township, Ottawa County. He found one man in an advanced stage of the disease. The family had been vaccinated and all exposed persons quarantined. In another case the attending physician had vaccinated the father of the family and after fumigation had allowed him to go to the house of his mother, where he intended to remain and continue his work. The other members of this family were vaccinated and quarantined, and all exposed persons and children in the school where the boy attended will be vaccinated.

February 20th and 21st, the epidemiologist visited Lathrop, a small unincorporated village in Berne Township, Athens County, and February 26th and 27th, Cutler and Bartlett, villages in Fairfield and Wesley townships, Washington County, to investigate cases of an eruptive disease, about which complaint was made. His report may be found on a subsequent page.

February 27, Dr. J. C. Cullen, medical inspector, of Toledo, was sent to Bradner, where he found five well developed cases of smallpox. All exposed persons had been vaccinated; schools, picture shows and churches closed and public gatherings prohibited. In January a woman visited this family, coming from Chicago via Fremont, and while there had smallpox. She returned home and her husband came down with smallpox on January 21st.

February 28th, in compliance with a request from the health officer of London and the Madison County Medical Society, the epidemiologist visited London to investigate two cases of an eruptive disease in persons who had been exposed to smallpox prevailing among a gang of workmen on the electric railroad. His report may be found on a subsequent page.

March 12th, the epidemiologist investigated three cases of smallpox in Center Township, Guernsey County.

In response to numerous requests, the epidemiologist in company with a representative from the State School Commissioner's office, on March 4th visited Hilliards to investigate a case of tuberculosis. His report may be found on a subsequent page.

Proposed or Additional Water Supplies.

The engineering department has investigated the site for a proposed new water supply at Continental, proposed water purification plant at Rossford, proposed water supply improvements at Ravenna and a proposed additional water supply at Westerville.

Reports on the Continental, Rossford and Westerville propositions have been prepared for consideration, together with a report on the plans for the development of a proposed water supply for Glouster.

The water purification plant under construction at Alliance was also inspected by one of the engineers.

Existing Water Supplies.

The existing water supply at Tiffin and at Youngstown has been investigated.

In February an examination was made of the pollution of Summit Lake by sewage discharged into it from the Lakeside Avenue sewer at Akron. The analytical results of a number of samples collected indicated that the raw water was rendered safe for drinking purposes by the hypochlorite treatment. One of the samples taken from the distribution system showed the presence of large numbers of bacteria and also organisms of intestinal origin, which indicated that a portion of the supply had been pumped into the mains without treatment. The authorities of Akron were advised that owing to the dangerous character of the raw water it is essential that the supply be carefully treated at all times.

It was learned that owing to the settlement and failure of the sewer and its consequent stoppage, it became necessary to temporarily pump the sewage above the point of failure. The sewage thus pumped was being diverted to swampy land bordering Summit Lake and was by this means reaching the source of water supply of the city. The authorities were advised that although Summit Lake is already polluted, the procedure of pumping sewage into the lake is in every way to be condemned and should be stopped immediately; that a temporary device should be provided to dispose of the sewage by pumping it into another sewer which will divert the sewage from the lake. They have since replied that they have discontinued pumping sewage into the lake, that the sewer has been repaired, and that plans are being prepared for entirely new sewerage for this district.

Attention of the director of public service of Canton was called to the fact that in May 1912 the State Board of Health permitted temporary use of calcium hypochlorite to treat that portion of the water supply of Canton obtained from the west branch of Nimishillen Creek via the water works race, pending the installation of an additional well supply prior to October 1, 1912. The use of the race water is attended by danger of producing typhoid fever and should only be resorted to in extreme emergency. Attention was called to the importance of council providing for a study of available sources.

Recent examination of the water supply of Eaton indicates that the water, derived from springs and wells, is of satisfactory quality from a sanitary standpoint and suitable for domestic use. The emergency intake, drawing water from Seven Mile Creek, has been used rarely during the past five years. The authorities were advised, however, to exercise the greatest care in the use of this emergency supply, and whenever it becomes necessary to use it to notify the consumers through the health officer, to boil the water used for drinking purposes.

Recent examination indicates that the water supply of Jackson is of satisfactory quality from a sanitary standpoint, though the presence of a high iron content renders the water objectionable and causes the staining of plumbing fixtures, due to deposits in the mains. The attention of the water company was called to the advisability of installing a deferrization plant to remove the iron before the water is pumped into the mains.

A recent examination by the engineering department, of the existing water purification plant at Toledo, indicates that the plant is giving good results in the treatment, producing a water entirely safe for all purposes. The raw water in the Maumee River at the time of examination was not seriously polluted, though it carried considerable suspended matter. The filtered water showed no indication of contamination.

The attention of the director of public service was called to the advisability of making a change in the clear well to provide for better circulation of water. As used, the inlet and outlet of the clear well are at the same point which minimizes the opportunity for circulation. An indicating rate of filtration gage should be installed at each filter to enable the superintendent to quickly note the rate of operation. It also appeared that insufficient attention is given to the analytical control, and the director was advised that frequent examinations and analyses should be made to determine total bacteria, B. coli, turbidity, alkalinity, color, and that complete organic and mineral analyses should be made at intervals, to study the efficiency of various portions of the plant so that the operation may be modified to secure the greatest efficiency possible. He replied that he would take the matter up with the consulting engineer at once.

On March 4th and 5th the principal assistant engineer made an examination of the water supply of Youngstown, with special reference to the occurrence of typhoid fever in that city. A number of samples were collected and examined in our laboratory for quality. The investigation revealed the fact that the occurrence of typhoid fever recently has been in excess of the normal for the city and although no definite conclusions have been reached, the indications are that the water supply is the source of infection. The water purification plant is operated at its ultimate capacity at all times and is seriously overworked to supply sufficient water, and cannot therefore be expected to produce a water of uniform quality, nor one safe at all times for domestic purposes. The raw water reaching the plant is seriously polluted by sewage which reaches the Mahoning River above the intake. At the time of inspection it was also learned that large quantities of night soil had been deposited upon land bordering a small stream tributary to the Mahoning River above the intake, which source of pollution adds to the contamination of the raw water. The authorities were advised to take immediate steps to disinfect the night soil recently deposited on this land to prevent undue pollution of the raw water. They were also advised to resort to a temporary emergency treatment of the supply, to safeguard the health of the consumers. It was learned that copper sulphate had been used recently for this purpose, and they were informed that the use of this disinfectant for public water supplies has not been demonstrated to be entirely satisfactory and they were therefore advised to discontinue its use; but as the situation at Youngstown appears to require that an emergency treatment be installed, the officials were advised to have a complete study of the situation made by an expert and recommendations submitted.

Examination of the water supply of Wellston showed that the water, while satisfactory as to the mineral constitutents, is entirely unfit for domestic use; but would probably admit of purification by a properly constructed filter plant.

Examination was made of the water from a drilled well proposed as a water supply for Wellston. In general the analytical results indicated that the water is entirely unfit for public water supply purposes. It is highly turbid, objectionably hard and contains excessive chlorine and iron contents. The bacterial content was also unsatisfactory, though it may have been due to the method of pumping the well.

The authorities of Wellston were advised of these facts.

Proposed Sewerage and Sewage Treatment Works.

Bexley, Maumee, Newburgh Heights and Vermilion were visited relative to sewerage, or sewage treatment, and reports have been prepared for consideration at this meeting on proposed site for treatment works at Bexley, sewerage for District No. 4 Canal Dover, proposed sewerage for Maumee, Newburgh Heights, Madisonville (Cincinnati) and sewerage and sewage treatment works for Vermilion; also a report upon an extension of the approval of Local Sanitary Sewer No. 1, Main Sewer District No. 2, West Toledo.

The sewerage conditions have been investigated at Lorain, Wapakoneta and the Auglaize County Infirmary near Wapakoneta.

Complying with the 1st Condition of the Board's approval of a proposed water supply for Payne (October 23, 1912) the council of that city on March 3, 1913, passed an ordinance prohibiting the establishment of any service connections to the distribution system of the water works for domestic purposes.

Bense Propositions.

On February 26th the order was submitted to the Attorney General, embracing the resolution requiring the city of Ironton to install and have in operation a water filtration plant, of a design satisfactory to the State Board of Health, on or before eighteen months after its approval by the Governor and the Attorney General.

In 1908 a petition was received from the trustees of Milton Township, Jackson County, asking the Board to investigate the pollution of Meadow Run by the sewage of Wellston. As the constitutionality of the act was then in question the investigation was postponed. Recently a member of the engineering department visited Wellston but found upon investigation that at the present time no nuisance is being created. The stream, however, was at rather high stage, and the trustees have been informed that if they desire the Board to make further examinations it will be advisable for them to submit a resolution adopted by them renewing the complaint.

On the 18th day of February the council of the city of Bucyrus passed an ordinance declaring it necessary to construct a sewage disposal plant and an intercepting sewer; and an ordinance authorizing and directing the director of public service to employ a sanitary engineer.

The authorities of Cambridge and Toledo, and The German American Sugar Company of Paulding were notified that the Board would give them a hearing at its March meeting, and the German American Sugar Company has asked to have its hearing at the April meeting in order to allow their general superintendent to be present.

On March 4th, the committee on the pollution of boundary waters, consisting of Mr. Hill, chairman, Dr. Miller, the bacteriologist and the chief engineer, met at the Statler Hotel in Cleveland for a conference with representatives of the cities on Lake Erie. The assistant secretary attended the meeting, at the request of Mr. Hill, and has sent a report of the conference to the chairman of the committee.

State Inspection of Plumbing.

The State Inspector of Plumbing has spent his time working on the revision of the State Plumbing Code. He has made inspections in but one city, Wapakoneta.

Certificates of approval have been issued to the owners of buildings at Lima, Ironton and Martin's Ferry and the test on the Archeological Museum Building, at the Ohio State University, was accepted.

February 19th and 20th the Inspector attended the meeting of the Ohio State Master Plumbers' Association in Toledo, and addressed the convention on "Ohio Sanitary Laws", and answered questions on sanitation.

Since the last report, 26 places have been visited and 26 inspections made by a representative of the Board.

APRIL MEETING.

Smallpox. April 11, 1913, the epidemiologist was sent to Clay Township, Scioto County, to see a suspected case of smallpox, which he diagnosed as chickenpox. His report may be found on a subsequent page.

During the investigation of the flood conditions at Portsmouth several additional cases of cerebro-spinal meningitis were discovered and the epidemiologist, Dr. Boudreau, was sent to that city at once. He has reported 30 cases and 12 deaths from the disease.

INVESTIGATION OF FLOOD CONDITIONS IN OHIO.

During the last week of March, 1913, Ohio was visited by the most disastrous flood in its history. Immediately upon learning of the extent and seriousness of the flood the Secretary held a conference with the heads of the various divisions and outlined a plan of procedure.

The following rules were formulated:

RULES FOR REESTABLISHMENT OF SANITARY CONDITIONS WITHIN FLOODED DISTRICT.

1. Reestablishment of water supply.
2. Disinfection.
3. Removal of putrescible matters.
4. Cleaning of streets and walks.
5. Reestablishment of sanitary conveniences.

All of the above should be accomplished in general in the order named. If possible, all of the remedial measures should progress simultaneously, but this may be impossible.

1. Reestablishment of water supply.
    a. Boil all water used for drinking purposes.
    b. If fuel cannot be obtained municipality must distribute supply of assured sanitary quality by tank wagons, barrels or otherwise.
2. Disinfection. (Note below for disinfectants.)
    a. Spread lime generously over flood deposits which cannot immediately be removed.
    b. Whitewash interior of buildings after deposits have been partially removed by scraping by the owner or municipality.
    c. Disinfect fecal matter in vaults and upon surface, which cannot be immediately removed, by use of calcium hypochlorite.
3. Removal of putrescible matters.
    a. Fecal matter, dead animals, garbage and other putrescible wastes should be immediately removed, if possible, in wagons and properly disposed of.
    b. Fecal matter and other semi-liquid wastes may be discharged into existing sewers through manholes.
4. Cleaning of streets and walks.
    a. By flooding if water supply is available.
    b. By scraping and brooming if water supply is not available.
5. Reestablishment of sanitary conveniences.
    a. Where sewer is available and can be used.
        1. If dwellings have no indoor sanitary conveniences or water supply is not available build temporary closets over manholes.
    b. Where sewer is available but cannot be used.
        1. Provide watertight metallic covered receptacles to be emptied when sewer is available.

- c. Where no sewer is available.
    - 1. Provide watertight metallic covered receptacles to be used until other provision is made, and to be emptied into nearest sewer or vault at the direction of the health department.

6. Cleaning of yards, houses and buildings.
    - a. Owner shall scrape ceilings, inside and outside walls, floors, walks and yards, piling material in street. If owner is unable to accomplish this the municipality should proceed with the work.
    - b. Ceilings, walls and floors should be whitewashed. Walks and yards should be sprinkled with lime.
    - c. Cleaning by owner may be completed after whitewash has dried.
    - d. Provision for pumping flooded cellars must be made by municipality.

DISINFECTANTS.

Lime.

1. If lump lime is used it should be slaked to a dry powder, which should be scattered freely over deposits.
2. If hydrated or slaked lime is used apply as before.
3. For whitewash mix hydrated or slaked lime with twice its volume of water to proper consistency, to apply with brush.

Hypochlorite.

1. Make solution from paste in proportion 5 pounds of powder to 1 barrel of water (30 gallons).
2. Use one barrel of such solution to one cubic yard of fecal matter.

Note: If fecal matter is in solid condition remove immediately without use of hypochlorite. If in semi-liquid condition disinfect, stirring to accomplish mixture.

Formaldehyde.

To be used in accordance with regulations of local health department.

RULES FOR THE CONTROL OF COMMUNICABLE DISEASES IN FLOODED DISTRICTS.

1. Where it is necessary to remove persons quarantined for contagious diseases or for having been exposed thereto, especially smallpox, diphtheria and scarlet fever, they must be taken in charge by the board of health and removed to separate buildings, and physicians, nurses and food be supplied.

2. All persons, societies or institutions taking in refugees from flooded districts should immediately notify the board of health so that an investigation can be made to determine if such refugees have a communicable disease or have been exposed thereto. A register of all persons coming under the supervision of the board of health should be kept.

3. All refugees sent to large buildings, or volunteered homes, must be examined by a physician with especial reference to sore throat, fever and eruption. All suspects should be placed in a detention building or kept under observation by the board of health.

4. All exposures to, and persons coming from districts where smallpox exists must be immediately vaccinated.

5. Typhoid patients should be carefully guarded and their feces and urine disinfected immediately.

6. Anti-typhoid inoculation will prevent typhoid fever and should be practiced where possible.

7. The board of health and water works officials must give continuous warning to BOIL ALL WATER FOR DRINKING PURPOSES where the supply is from private wells in flooded areas or where the public supply is taken from a stream or from wells that are in a flooded area. Boiling should be continued until notice from the board of health.

8. Physicians should volunteer for medical and sanitary work and place themselves at the disposal of the board of health and co-operate with it.

Severe epidemics of typhoid fever and scourges of other contagious diseases often follow in the wake of floods. All precaution must be taken to prevent this.

The epidemiologist, bacteriologists, engineers, and plumbing inspector were sent to the places known to be in need of advice. The regular force was ably assisted by Doctors Allen, Boucher, Hersom, Lambert and Wright of Columbus, and by the following engineers: C. F. Long of Columbus, and W. H. Gould and W. H. Griffith of Toledo, Mr. A. Elliott Kimberly of Columbus.

An order to boil all water used on passenger trains, in waiting rooms, and by all railroad employees was issued to the General Manager of every railway, steam or electric, operating in Ohio.

The following statement was issued through the newspapers:

STATEMENT FROM OFFICES OF THE STATE BOARD OF HEALTH.

The receding of the flood waters is very likely to be attended with serious epidemics of communicable diseases. The local health departments will work with all possible rapidity in removing the various nuisances created and will exercise great care to prevent the spread of disease. All citizens should aid the health departments in cleaning up their respective localities as quickly as possible. Dead animals and all organic refuse should be collected and destroyed at once and lime should be used quite freely through the territory which has been inundated. ALL DRINKING WATER SHOULD BE BOILED BEFORE BEING USED until otherwise ordered by the local health authorities. General vaccination orders should be issued by all local health officers, as a serious epidemic of smallpox threatens Ohio. Physicians should make it a point to report all cases of communicable diseases at the earliest possible moment after diagnosis has been established.

(Signed) E. F. McCampbell, M. D.
Secretary and Executive Officer
State Board of Health.

Upon learning of the conditions in Dayton, Dr. Grube went to that city where he remained for several days.

Mr. Hill also went to Dayton and in company with the Chief Engineer, Mr. Dittoe, visited Middletown and Hamilton to inspect the water supply and sewerage conditions.

CUYAHOGA RIVER WATERSHED.

Akron, a city of 69,067, was visited by Dr. T. R. Brown on April 7th. The damage to private property in the city was small compared with that in other places, but there was considerable damage to streets, sewers and other public property which will have to be repaired or replaced by the city. The conditions were well handled by the local authorities and from a sanitary standpoint the city will soon assume its normal condition. The mayor reports that five people were drowned.

Kenmore. (Population 1,561.) The damage in this village was small and a personal inspection was not made, but it was reported that the village authorities were active in repairing public improvements and in cleaning up the rubbish left by the high water. The principal damage was due to unpaved streets which will have to be repaired at some considerable cost.

GREAT MIAMI WATERSHED.

Sidney. When in Piqua, March 29th, Mr. Fred Berry, assistant bacteriologist, telephoned to Sidney and also interviewed persons from there relative to flood damage and sanitary conditions. He was informed that the flood has caused but little damage and that sanitary conditions were good. Because of smallpox in the city a personal investigation was made April 8th. It was found that they had not had recent cases and that all were closely quarantined.

Piqua. Mr. Berry and Dr. H. R. Wright arrived in Piqua Saturday evening, March 29th, accompanied by Senator Kiser. A conference was immediately held with Dr. Lowe, health officer, followed by an inspection of the flooded area. Districts most affected were East Piqua, Rossville and Shawnee. Dr. Lowe had attempted to effect an organization by taking charge of the recovery, identification and disposal of the dead; two other members of the local board were to look after gathering and disposing of dead animals, street cleaning, etc. Prompt notice was given to boil all water used for drinking purposes. The inspectors met with the board and health officer and went over in detail the instructions for re-establishing sanitary conditions and recommended that a supply of lime for disinfection purposes be secured as soon as possible. Instructions were also given for the care of refugees to prevent the spread of contagious diseases. One case of typhoid fever at the hospital was the only known disease in the city. At a joint meeting of council and board of health the question of securing funds for cleaning was discussed.

After complaint to the Medical Corps, Ohio National Guard, another investigation was made by Mr. Berry and Dr. Wright April 5th and 8th. A meeting of council and the board of health was called and it was decided to allow the board of health $2,500, only a small part of the amount actually needed. The inspectors found that 100 sacks of lime had been distributed and four cars ordered. Water was being distributed from tank wagons. Some progress had been made in cleaning the city and all dead animals had been removed. Garbage cans for all families and temporary public toilets were recommended. The health officer was instructed to see that putrescible matter was not dumped into the river. Conditions will rapidly reach normal if council will furnish the necessary funds to the health department. Containers were furnished for samples of water.

Troy. Mr. Berry and Dr. Wright reached this place at 6:30 P. M., March 28th, called on the mayor with members of the Springfield relief committee, who accompanied them from Springfield in an automobile. They found that possibly three-fourths of the city had been affected and that there had been a considerable property loss and the loss of some lives. At 8 P. M. a meeting of the board of health was held in the mayor's office, where measures for re-establishing sanitary conditions were assumed by the inspectors. Provision had already been made for the recovery and identification of bodies. The public water supply wells had all been submerged. but the pumping station was not damaged. Subsequent examination of the samples of water submitted by the health officer showed that the supply had been contaminated. Dr. Eddy, clerk of the board of health, was in charge of removing dead animals. An order was issued by the local board of health to boil all water used for drinking purposes. It was recommended that a supply of lime be secured at the earliest possible time and that it be freely used in disinfecting cellars, outhouses, rubbish, etc. The mayor also took precaution to require that all clothing distributed by the relief committee should be thoroughly disinfected and two physicians were appointed for this work. No contagious diseases were reported, but the inspectors advised that a medical inspection of all refugees be made. It is estimated that 90 per cent. of the population has been successfully vaccinated and that the remainder will be vaccinated without delay. A second visit was made to Troy on March 30th, and it was found that the local officials had been very active and that the situation was well in hand.

Tippecanoe City. While at Troy on March 28th, inquiry was made of conditions at Tippecanoe City. The inspectors were informed that owing to the location of this village, but little property damage had been sustained; one person was reported as drowned. On returning from the first inspection the inspectors went through Tippecanoe City and observed that the village was in its ordinary condition in regard to sanitary conditions.

Springfield. An inspection was made at Springfield by Mr. Berry and Dr. Wright, March 28th. It was found that there had been considerable property damage, with one life lost. The inspection was made in company with the health officer, and it was decided to issue an order to boil all drinking water and enforce instructions for re-establishing sanitary conditions in the affected area. A conference was also held with the Springfield relief committee. The committee had been enforcing medical inspection and a complete registration of all refugees from the city and also those from other districts had been provided. The most serious danger in Springfield came from the importation of cases of smallpox from the country districts in Clark and Champaign counties. A number of cases of this disease have occurred in the city but all of these cases when found were carefully quarantined. Dr. Seward. health officer. was ordered by the Secretary's office to investigate smallpox conditions in the country districts and to issue such orders to local authorities as would prevent any further danger from this source. A letter was sent from the State Board of Health to the health officer of every township in Madison, Champaign and Clark counties, calling attention to the smallpox situation and giving full instructions for dealing with the disease.

Xenia. Mr. Berry and Dr. Wright reached Xenia at 2 A. M. March 28th, and consulted with the local member of the State Board of Health. After investigation it was found that probably 100 refugees from Dayton had been brought in on Thursday and these were quartered in a church and at the Y. M. C. A. Many others, no doubt, were scattered through the residential district. Nurses were in charge and later medical inspection of all these refugees was maintained by Dr. Spahr and the local health officer, Dr. Messenger. Xenia was not affected by water.

Greenville. A personal investigation was not made at Greenville. This city has a population of 6,237. The lowlands surrounding the city were flooded; the water pumping station being put out of commission. The mayor issued a proclamation, calling attention to the condition ot the public water supply and requiring that all water used for drinking and cooking purposes be first boiled. Instructions were also given as to the care of water closets until the water supply was again available.

Miamisburg. This village, which has a population of 4,271, was visited by Mr. L. H. Van Buskirk, assistant engineer, State Board of Health, and Dr. F. A. Lambert, March 28th. A meeting of the board of health, health officer and other village officials was called and measures were discussed for re-establishing the sanitary conditions of the village. Not many refugees were found and but a relatively small part of the village affected, principally the business section. Food and fuel were being furnished by farmers and residents of the neighborhood, and the local officials seemed to be in a good position to handle the situation.

On complaint of lack of attention by the local officials, a second investigation was made by Mr. M. Z. Bair, assistant engineer, who reported that as far as he could observe the complaint was unwarranted.

Dayton. Immediately upon learning of the extent of the flood at Dayton, Mr. M. Z. Bair, assistant engineer, and Mr. W. H. Groeniger, State Plumbing Inspector, were sent there and have remained. The Secretary left for Dayton on March 30th and remained two weeks, cooperating with Major Rhodes of the U. S. A. who had been detailed there by President Wilson. A full report will be made later.

Middletown. Investigation was made by Mr. Van Buskirk and Dr. Lambert at Middletown, March 28th. This city has a population of 13,152. On arriving the inspectors had a meeting with the mayor and city solicitor and arranged for a meeting of the city officials, the board of health and all physicians available. The inspectors found teams and laborers busily engaged cleaning streets. The greatest damage done was from mud and water to the houses. About one-fourth of the city was affected, this being in the business district. Dr. Lummis, health officer, and Mr. Verity, president of the American Rolling Mills Company, were especially active in effecting an organization. It was found that abundant relief, medical supplies and shelter had been provided and the few cases of measles in the affected district had been taken care of by a woman who had a case of the disease in her family and who generously offered to care for the other children. A notice to boil all water used for drinking purposes had been given by the health department. The water supply and sewers were not badly affected. The council had provided a fund of $250,000 to be used in sanitary work.

Franklin. Investigation at this village was made by Mr. Van Buskirk and Dr. Lambert on March 29th. Franklin has a population of 2,659. The inspectors found the village council in a body making an inspection of the affected district. A meeting was held at the town hall with the council, mayor, village solicitor and all the physicians. Council immediately provided for borrowing money for cleaning the village and the local bank agreed to accept any obligation council might wish to assume. The principal damage was in that part of the village on the west side of the river and this did not cause the suspension of business. The village was well provided for and a fund for relief had been raised. One feature that struck the inspectors very forcibly was the fact that instead of holding church services on Sunday, the church members devoted the day to assisting in cleaning up the affected district.

Hamilton. Mr. Van Buskirk and Dr. Lambert reached Hamilton at noon on March 29th, and reported at military headquarters. Hamilton has a population of 35,279. Colonel Zimmerman, who was in charge, gave every assistance to the inspectors in investigating the affected district and in bringing to the attention of the officials and residents of the city the instructions for dealing with the situation. He was ably assisted by officers of the Ohio National Guard and the United States Navy Medical Department. The investigators found that property, both private and public, had been damaged to a greater extent than in any place they had visited. From two-thirds to three-fourths of the city was affected and all business had been suspended. A competent relief organization had been perfected and also an organization for re-establishing sanitary conditions.

At the suggestion of Colonel Zimmerman, Mr. Van Buskirk prepared for publication, instructions to the people for dealing with the questions involved, and such a statement was published in the local papers on Sunday. There was some delay in getting reconstruction work started, due to failure to get teams and tools with which to do the work; but as soon as these were provided the work was taken hold of and a second inspection by Mr. Dittoe showed that a great amount of work had been done and was being carried on in a systematic way.

Attention was first given to the recovery of bodies and to the disposal of dead animals. When the first inspection was made on March 29th, at least 60 carcasses had been hauled away and burned by using quantities of debris. At the time of this writing 72 bodies has been recovered.

LITTLE MIAMI WATERSHED.

But little accurate information has been gained for the municipalities on this watershed. From information received from health officers and newspaper clippings it is evident that several of these places were badly affected, though not so much as some of the other watersheds.

Morrow. The health officer of Morrow, which has a population of 832, reported that all business buildings and nine-tenths of the dwellings were flooded to a depth of from 3 to 9 feet. There was some difficulty in meeting conditions owing to the lack of funds for the health board. The health officer was instructed how to proceed in order to obtain the necessary funds. Instructions were also given him in regard to the best methods to be followed in cleaning up the village.

South Lebanon. South Lebanon was affected in about the same manner as Morrow and had about the same difficulty in regard to funds and the securing of disinfectants. South Lebanon is a village with a population of about 600. Instructions were sent to the health officer and personal requests were made to the flood relief commission for lime. It was also reported that the village of Milford was badly affected but the extent of the damage has not been made known up to this time.

An engineer was instructed to investigate conditions along the Little Miami River, but owing to delay in completing other work it has not been possible to make this investigation.

MAUMEE RIVER WATERSHED.

Napoleon and Defiance. Under instructions from the Secretary's office, Mr. Griffith telephoned from Toledo to the relief committees at Napoleon and Defiance, which were reported by the newspapers to have been damaged. The former of these is a village with a population of 4,007, while Defiance is a city of 7,327 inhabitants. Mr. Griffith stated that at Napoleon the local relief committee reported the village to be in good condition and the authorities were actively engaged in restoring the small amount of damage done.

At Defiance, Dr. Westrick, health officer, telegraphed in regard to flooded houses and stated that he was actively engaged in supervising the cleaning and disinfecting of these houses and streets. No assistance was needed.

Lima. This city with a population of 30,508, was under water in a small portion, but no considerable amount of damage was done and no loss of life reported. The municipal health officials and the civic associations set to work early to clean up the inundated portion of the city. The director of public service estimated that it would be several weeks before normal conditions could be restored. Public notice was given of the liability of contamination of the public water supply and all persons were warned to boil water to be used for domestic purposes.

Van Wert. A small part of this city of 7,157 inhabitants was overflowed and all persons were warned against using water from any other source than the public water supply. There has been no report of the extent of the overflow or damage done up to the present time.

Hicksville. A considerable part of the village was under water and the board of health ordered the surface wells and cisterns in the flooded section to be pumped out, thoroughly cleaned and disinfected. Hicksville has a population of 2,395. No report as to the amount of damage done or the extent of the territory flooded is available at this time.

Toledo. (Population 168,497.) The two pumping stations for Toledo were affected by the high water. The filtration plant on Maumee Road was not seriously affected and at no time was it necessary to shut down the pumps. At the Broadway station there was 10 feet of water, but two pumps were kept running so that the city was supplied with water all the time. There is no report available as to the amount of damage done or extent of the area overflowed.

MUSKINGUM RIVER WATERSHED.

Mansfield. At Mansfield, a city of 5,193 inhabitants, but a small portion was under water, although a large amount of mud and debris had to be removed. Council authorized the board of public service to use $2,700 for the removal of debris and obstructions to bridges, with the promise of additional appropriations should this become necessary. No reports have been received from the health department or other officials as to the amount of damage or area flooded. The board of health has been active in securing the cleaning up of the city. The water supply was cut off for a short time and containers were furnished for sending samples of the water for examination.

At *Canton,* a city of 50,000 the flood did not assume as grave proportions as lower down on the watershed, only a few houses in the east end being flooded; and it was not found necessary to incur a large expense in cleaning up the city. The garbage disposal plant was flooded to a depth of 30 inches, making it necessary to shut down the plant. At one time it was thought that the water works station would be out of commission, but this danger was avoided. No estimate as to the amount of damage done has been received.

Mt. Vernon, a city of over 9,000, was visited April 2d by Dr. T. R. Brown, bacteriologist of the State Board of Health, and an inspection made. He met the health officer, Dr. Blair, and after talking over the situation visited the flooded district. The damage done at Mt. Vernon was caused by the breaking of the levee at the power house, which caused the flooding of the south-western part of the city. Seventeen houses were affected by the flood but no lives were lost. The sanitary conditions were considered good. Public notices were published in the newspapers to boil all drinking water.

Brinkhaven, a village of 300, was inspected by Dr. Brown on April 3d. Upon arrival he met the mayor and health officer and visited the flooded district. There were three persons drowned at this place and at the time of inspection the bodies had not been recovered. Thirty-two houses were affected by the flood, five of which were completely destroyed. The heavy loss following the flood prevented the cleaning away of the debris. The village is supplied with water from shallow private wells and many of these were flooded. Instructions were given to boil all water used for drinking or domestic purposes. No precautions had been taken and the inspector gave the local officials orders in regard to what should be done to place the village in proper sanitary condition.

Warsaw, a village of 500, was visited by Dr. Brown on April 4th and the flooded district was inspected by him in company with the mayor and health officer. Only twelve of the 124 houses in this village escaped the flood. The water supply is derived from shallow driven wells. There is no sewerage system. Orders were given by the inspector to boil all water used for drinking or domestic purposes, and for the reestablishment of sanitary conditions.

Coshocton, a city of over 9,000, was visited by Dr. Brown on April 4th. Upon arrival he met the mayor and later Dr. Marshall, health officer, and inspected the flooded districts. There were 150 houses flooded and in 40 or 50 of these the water had risen to the second floor. There has been no typhoid fever or other contagious disease in the city for some time. Chloride of lime was abundantly used on the lawns, in the houses and in the cellars. There were no private wells in the flooded districts. Three lives were lost. The inspector found a good organization in charge of the health officer, who has shown himself to be a very competent official. Clowsville, a suburb of Coshocton was also visited, and 30 houses were found to be flooded. The sanitary conditions were being very well looked after. Notices were posted covering practically all sanitary requirements.

Roscoe, a village of 600, was visited on April 5th by Dr. Brown, accompanied by Dr. Marshall. It was found that 24 houses had been flooded. No instructions had been given in regard to boiling water or the use of disinfectants, etc. These instructions were given by the inspector and the health officer was advised to consult with Dr. Marshall in regard to sanitary matters.

New Comerstown, a village of about 2,000, was visited by Dr. Brown on April 5th. Two hundred out of 500 houses were in the flooded district. A supply of disinfectants had been ordered. The public water supply seemed to be in good condition. Contrary to the information received from the health officer, it was found that at least two-thirds of the people in the flooded district were using water from private wells. Public notice was given to boil all water for drinking or domestic use, and instructions were also given in regard to the use of disinfectants and on general sanitary matters.

Canal Dover, a city of about 7,000, was visited by Dr. Brown on April 5th. He found 60 houses in the flooded area. No lives were lost. The public water supply was found to be in good condition. Sanitary conditions were good. No recommendations were deemed necessary.

New Philadelphia, a city of over 8,000, was visited by Dr. Brown on April 6th. He was unable to find either the mayor or health officer. About 75 houses were flooded. Upon investigation it was found that proper sanitary precautions had been taken and conditions may be considered good.

Uhrichsville, a village of 4,000, was visited by Dr. Brown on April 6th. He found the flooded district to comprise about 75 houses. Practically all debris had been removed. Sanitary precautions had been taken and conditions were considered to be fairly good.

Dennison, a village of over 4,000, was visited by Dr. Brown on April 6th. There were about 60 houses in the flooded area. Instructions were given to boil all water used for drinking or domestic purposes and to disinfect houses and privies with chloride of lime. The general sanitary conditions were found to be good.

Massillon, a city of over 13,000, was visited by Dr. Brown on April 6th, who made an inspection in company with Dr. Miller, health officer. He found that about 80 buildings were in the flooded area and that all precautions had been taken to restore sanitary conditions. There had been no typhoid fever or other contagious disease during the past three months. Water and food supplies were found to be in good condition.

Millersburg and Killbuck. A personal inspection was not made, but from observations made from the train at Millersburg it was noted that no more than eight or ten houses had been flooded. Very little damage had been done except to a lumber yard. At Killbuck it was noted that several houses had apparently been affected but little damage had been done.

Zanesville, (28,025). Dr. F. G. Boudreau, the epidemiologist, was sent to Zanesville on March 29th, where he found 8 cases of smallpox, 11 cases of scarlet fever, one case of chickenpox, and 4 cases of typhoid fever in the Seventh and Ninth wards. He reported that exposures were being vaccinated rapidly and quarantine was being enforced with the aid of the militia. With the help of Past Assistant Surgeon C. W. Willie, who was sent to Ohio by the Surgeon General of the United States, and Dr. McCormick, health officer, the plan outlined by the Secretary for cleaning the city and taking care of contagious diseases, was carried out. The city was divided into seven districts, each under the care of a physician, who was empowered to appoint assistants, and each carried a typewritten copy of his duties. An appropriation of $25,000 was provided by council for cleaning the city and the work was placed under the direction of the director of public service.

A contagious disease hospital was provided and each district in the city was visited by a water wagon carrying sterilized and safe drinking water. A large quantity of lime was placed over the flood deposits and putrescible material was removed from all parts of the city, outhouses constructed over privy vaults and a dump established. At this writing the loss of life is reported as 2; houses destroyed 450; and the number rendered homeless 8,150.

In *South Zanesville* sixteen families were quarantined on account of smallpox. The school was closed for a period of two weeks and all school children required to be vaccinated before re-entering school. The number of exposures was large, but a house-to-house canvass was made and it is thought that every case of the disease present was discovered.

The situation in South Zanesville was placed in the hands of C. A. Horson, representing this Board, who provided for the vaccination of all school children and insisted upon employers making employment conditional upon vaccination. Typhoid vaccine was provided by the military authorities and by the Public Health and Marine Hospital Service.

Athens. (Population 5,463.) Conditions in Athens were not serious enough to require an inspection by this department. A considerable part of the city was affected by the flood, but the local authorities were able to take care of the situation. The principal damage done was to the property at the State Hospital for Insane. The local authorities were active in the work of relief and in restoring sanitary conditions. The exact amount of the damage has not been reported.

OHIO RIVER WATERSHED.

Marietta, with a population of 13,000, was seriously affected by the flood. The city is located at the confluence of the Muskingum and Ohio Rivers, and is divided by the Muskingum, the largest portion of the population living to the eastward. When our inspectors, Mr. L. H. Van

Buskirk, engineer, and Dr. Boucher arrived it was found that 67 per cent. of the total number of houses was flooded, and 33 per cent. flooded up to and above the second story. One hundred and fifteen houses were completely washed away and 200 so damaged that they will be uninhabitable; and 500 persons rendered homeless.

Some difficulty was experienced in securing laborers, but council provided a maximum of $2.25, and on April 7th a large number of men with teams reported for work. The people cleaned their houses rapidly.

In addition to the local officials, Col. Knox of the Ohio National Guard, was in charge of troops. The sanitary troops were under Major Love. With the advice of the health officer and Major Love the city was divided into districts and each district inspected by some member of the sanitary troops. It was found that a large portion of the population was boiling its water supply and that the sewers were in such a condition that they could be used. Where sewers were not available the sanitary troops under Captain Wilson of Toledo, erected outdoor closets. The water supply was out of commission from March 27th to March 31st, 1913. The pumping station had been cleaned, however, and was in operation at the time of the inspection. The filter plant had been generally cleaned out but could not be used owing to the fact that the entire supply of coagulant had been destroyed; and it was with great difficulty that a supply was obtained from Pittsburg, being transported by boat. On April 9th the coagulant was received and the filter plant was placed in operation at about 7 P. M. A supply of chloride of lime was ordered but had not been received on April 11th. On Monday a large portion of the flood deposits were removed but on Tuesday, owing to the declaration of martial law by Col. Knox and the refusal of the local officials to proceed with cleaning, the work was somewhat retarded and not until Thursday morning was it possible to obtain the same energy directed to the cleaning up of the city.

On April 9th a case of smallpox was found which had been circulating freely about the city and to which a large percentage of the population had been exposed. The case was immediately quarantined and a general notice given advising vaccination. This notice had a decided effect, as a large percentage of the people was being vaccinated as fast as the local doctors and medical corps physicians could care for them.

A carload of lime had been received and while not being used generally on account of its inaccessible location, provision was made for its distribution about the city.

The general situation at Marietta is improving gradually and it should be a question of but a few days until the city will be freed from the flood deposits which were upon the streets and in the houses.

All dead animals and garbage were being either burned or buried.

Belpre. The village of Belpre, which has a population of 1,300, is located on the Ohio River about twelve miles below Marietta and directly across from Parkersburg, West Virginia. There were no lives lost at Belpre. Fifteen houses were completely washed away and 15 additional houses floated from their foundations. A small portion of the village which lies on low ground is covered with the characteristic flood deposits.

Practically all of the houses were being properly cared for and the general appearances were good. The village has neither a public water supply nor sewerage system, but a sufficient number of outside closets were available so that no decided inconvenience was being experienced. The water supply is ordinarily obtained from private wells and cisterns, which were so filled with mud that they could not be used. The Baltimore and Ohio Railroad had installed a small pipe line, placing the pipe on the surface of the ground so that water was available at a tap near the center of the built-up portion of the village. Most of the water was obtained at this source. A general order to boil all water was issued. Lime was available and was being generously distributed about the village. Instructions were given as to the use of chloride of lime and an order placed for a sufficient amount to properly care for the disinfection of all closets. Dead animals and garbage were being either burned or buried. The greatest difficulty at Belpre was in being able to secure a sufficient food supply for the refugees.

Racine and Syracuse. While investigating conditions in Pomeroy on April 4th, reports were made of extremely bad conditions in Racine and Syracuse. As a result a letter was written by the representative of the State Board of Health, Mr. H. E. Babbitt, to the local health officer and the board of health at Racine, enclosing a copy of the rules for re-establishment of sanitary conditions made by the State Board of Health; and a copy of Sections 4450 and 5649 of the General Code, explaining and setting forth to the health officer and the board their powers and what had been done in other cities.

Pomeroy, a village of over 4,000 population, was visited on April 3d by Mr. H. E. Babbitt, assistant engineer, State Board of Health, to enforce the rules for the re-establishment of sanitary conditions.

The worst condition was in the northern portion of the village, where the poorer residential district is located. Very little destruction of buildings occurred in the business section of the city, and the better residential district was not flooded. Practically all goods in stores and warehouses was destroyed, causing much inconvenience and considerable suffering among the poor. The water supply, gas, electricity, etc., in Pomeroy were out of order. These conveniences are used in common with Middleport, being on the same distribution system. Owing to the steep grades in Pomeroy no average depth in the residential or business districts can be stated; but probably the maximum depths in both residential and business sections might have reached 20 to 25 feet, accompanied by a swift current.

At the time of the inspection some work was being done by the city council toward cleaning up the village streets, but the greatest attention was being paid to pumping out cellars and pumping flood water into the water mains. Nothing was being done toward disinfection, establishing sanitary conveniences, or preventing the rise of an epidemic. All relief work and much cleaning and salvage work was being done by the militia under Captain Hartley. The militia was the most active organization at work. At Pomeroy the health officer serves in lieu of a board of health. At the suggestion of Mr. Babbitt a meeting of the city council in conjunction with the militia and the health officer was called on the morning of April 4th. The powers and duties of the local boards of health were explained to them, and suggestions made as to the method of reestablishing sanitary conditions and conveniences. As a result $1,500 was raised and with $500 previously available, $2,000 was placed in the hands of the local health officer to be expended by him with the co-operation of the commissioner of public works and the militia, for the reestablishing of sanitary conditions. The first thing to be done was the establishment of sanitary conveniences, these to be cleaned daily. The employment of sanitary police, publishing of rules of the board of health, assistance in reestablishing water supply, cleaning the streets and cellars, and finally distributing throughout Pomeroy and sharing with Middleport, Racine, and Syracuse, a carload of lime and other disinfectants to be sent from Columbus.

Conditions in Pomeroy were bad only in the poorer residential and in the business districts. No loss of life and no disease was reported. The village and health authorities as one body were not active until after the visit of the inspector. The militia was very active and was doing excellent work.

Middleport, a town with a population of over 3000, was visited by Mr. Babbitt on April 3rd, and a complete investigation of the flood conditions made. The greatest damage occurred in the southwestern half of the village, which is the poorer residential district. The water at the crest of the flood reached a depth of approximately 15 to 20 feet on the street, flooding the houses above the second stories, carrying many of them away, and causing others to collapse. The streets were filled with debris of all kinds, including a few dead animals such as cats and rats, some garbage and many privies. There were practically no privies left in a condition fit for use. In the better residential and business districts the water reached a depth of 8 to 10 feet, but the destruction of buildings was not so marked due to better construction. The contents of practically every store and warehouse in the village were flooded and destroyed, causing much loss and suffering. No loss of life had been reported during the rapid rescue work carried on by the militia, who took things in hand almost immediately, but about 1500 were homeless. The crest of the flood was reached on March 30th in the evening, and the water had just left the streets at the time of the investigation on the afternoon of April 3rd.

All municipal conveniences were shut down, such as the water supply, sewerage system, gas, electricity, and street cars. The streets were anywhere from 3 inches to a foot under a covering of thin slimy mud. No sanitary conveniences whatever were at hand. An attempt was being made to obtain a water supply by pumping river water into the mains by means of a fire engine. This was unsuccessful probably because of the many broken service pipes.

The council had met and authorized the employment of 150 men at $2.00 per day and 100 teams at $2.50 per day to clean the streets, remove debris, and reestablish normal conditions. The water company in Pomeroy was attempting to repair the pumping station which had been flooded, but could give no hope of a water supply until the 6th of April. The lighting plant expected to be in operation by the same time. The street railway and steam railroad were hopelessly destroyed between Pomeroy and Middleport. The Toledo and Ohio Central Railroad entered the Middleport station on April 4th; the street railway had made no estimate as to when it would be in operation. All communication was cut off except from a telephone line through to Columbus, under the jurisdiction of the local militia. All supplies and relief were in the hands of the militia.

The local board of health was doing nothing, but at a meeting called as a result of the suggestion of the inspector, the rules adopted by the State Board of Health for the reestablishment of sanitary conditions and their powers under Section 4450 and 5649-4 of the General Code were read and explained by the inspector, and $200 was raised for the employment of sanitary police at $2.50 per day, for the establishment of sanitary conveniences, and for the removal of deposits in these conveniences. A hand bill describing the rules of the local board was published and distributed, paying particular attention to the danger of using the flood water for any other purpose than washing the interior of buildings.

Property loss and suffering was great in Middleport, possibly more than 60 percent. of the thickly settled area of the village being under more than 6 feet of water. The village authorities were working at cleaning up the village, and all municipal departments and companies were at work on reestablishing the conveniences. The local board of health was inactive until after the visit of the representative of the State Board of Health. There was no loss of life and no sickness reported. The militia was attending to the relief work and was giving excellent service.

Gallipolis. On April 2, 1913, an investigation of the conditions resulting from the flood in the Ohio River valley was made at Gallipolis by Mr. Babbit. The crest of the flood occurred in the evening of March 30th, the water flooding the main streets to a depth of approximately one foot. It was sufficient to flood all cellars and to cover the floors of the main retail stores, but did not destroy any large amount of stock or provisions. In the better residential district no houses were touched by the water except in a small district around the railroad station, where the water reached a depth of approximately 3 to 4 feet. The greatest destruction of property occurred in the northeastern section of the city. This is the section populated by the poorer people, but only a comparatively small portion of these suffered seriously. The Hocking Valley Railroad and the electric railway lines were completely destroyed for a distance of one or two miles.

At no time was the water supply endangered and the sewerage system was undamaged, although it was completely flooded for more than forty-eight hours. The electric light and power plant was shut down at the time of the investigation, due to damage by the flood. The natural gas supply was at no time shut off except for three or four hours on the afternoon of April 2nd, due to a break in the main.

The municipality of Gallipolis was, at the time of the investigation, assisting the property holders to pump out cellars, and had a force of men cleaning the mud off the streets and sidewalks. Two relief committees were at work assisting the sufferers. The local board of health had done nothing. At the suggestion of the inspector the board met at 9:00 o'clock on the morning of April 3rd, at which was given the same information and advice as at Middleport. As a result the local board of health raised $500 to defray the expenses of three sanitary policemen at $2.50 per day, of one or two teams for distributing lime, and for the disposal of night soil from privies erected by the board in sections of the city without such conveniences. A hand bill was published and distributed, explaining the necessity for care on the part of the people in moving back into flooded quarters, and a short summary of the rules of the State Board of Health was to be published in the local newspaper.

The damage in Gallipolis was slight, consisting mostly of flooded cellars. The municipality was cleaning the streets and pumping the cellars. The board of health was doing nothing, but became active as a result of suggestions from the inspector, and was carrying out the rules established by the State Board of Health. Two cases of scarlet fever had been reported to the local health officer, but no loss of life due to the flood.

Portsmouth. On April 2nd, Mr. W. H. Gould, a sanitary engineer of Toledo, visited Portsmouth as a representative of the State Board of Health to investigate flood conditions. He reported the lowlands flooded, involving a possible 80 per cent. of area of the city. The water had receded 33 inches at 3:30 P. M. The board of health requested council to provide $5,000 for emergency work. A sanitary organization was effected under the general supervision of the health officer, consisting of a chief sanitary officer and a number of sanitary policemen, one being allotted to each district. As soon as water receded sufficiently, laborers were immediately put to work cleaning up. A supply of lime was distributed as rapidly as possible. The Ohio National Guard was on duty but it was thought that probably more troops would be needed. The health officer reported 14 cases of cerebro-spinal meningitis, 5 cases of typhoid fever and 16 cases of measles. It was estimated that there were 12,000 refugees being taken care of in 11 school buildings, 12 lodge halls and in the second floors of houses. There seemed to be plenty of medical supplies, and provisions were being distributed daily to all. The sanitation in places of refuge was good, with a sufficient supply of good water shipped from springs in the neighborhood. Public notices had been given to boil all water not brought in from the springs and in regard to thorough disinfection with lime.

Dr. Fetter, local health officer, was in charge of sanitary matters and was carefully looking after the refugees. He communicated with neighboring cities affected by the high water and gave careful instructions to the local health authorities and officials as to methods of procedure.

SCIOTO RIVER WATERSHED.

Kenton. (7,185). From reports received the city of Kenton was flooded to a considerable extent principally in the part known as South Kenton. The council appropriated $1400 to the board of health for sanitary work and for the prevention of disease. No contagious diseases were reported with the exception of a few cases of measles. The water works plant was out of commission for a short time and public notice was given to boil all water used for drinking or other domestic purposes. As a temporary expedient a locomotive was used to furnish power to force the water through the mains.

Marion. (18,232). No personal investigation was made by a representative of the State Board of Health. Dr. Dana O. Weeks, health officer, reported by telephone that flood conditions were not serious at Marion. A small part of the city was under water but no great amount of damage was done and no loss of life has been reported to this office. Dr. Weeks and the citizens civic committee have interested themselves in the improvement of sanitary conditions in Marion and have also included all of Marion County. On April 1st a call was sent to all local boards of health in Marion County to meet with the civic committee in Marion on April 3rd, when it was proposed to consider the sanitary conditions of the county and to endeavor to instruct the local boards so as to make them more efficient. This meeting was held and from newspaper reports it is evident that a considerable amount of good was accomplished.

Green Camp. (308). This village, located at the junction of the Scioto River and the Little Scioto, was badly flooded and a great deal of damage was done. The exact amount of damage and the possible loss of life has not been reported. Under date of April 7th the health officer reported that with an assistant he had been busily engaged in having all of the houses in the village which were under water thoroughly cleaned and all the rubbish from houses, streets and alleys removed. He also reported that they had disinfected all houses which were affected by high water. An offer of assistance was made, but it was evidently not considered necessary to have an inspector from the State Board of Health as no reply was received.

Prospect. (945). A personal investigation was not made at Prospect as the health officer stated that assistance was not required. On April 1st the health officer reported that two-thirds of the village had been under water, but that no lives were lost. The damage to property was considerable. He asked for instructions in regard to the use of lime as a disinfectant. This information was furnished by telephone. On April 4th the health officer reported that they had purchased and freely distributed lime for a disinfectant around outhouses, piles or rubbish, etc., and that all dead animals had been collected and buried; and also that he had hired several wagons and men to remove rubbish from around houses and to clean streets and alleys. It is reported that there has been a considerable loss of personal goods, but only one dwelling house was seriously injured. A considerable number of outhouses, wood sheds and small barns were destroyed.

Delaware. (9,076). Dr. Brown and Mr. Groeniger made an inspection at Delaware on March 28th. They found that nothing had been done in the affected district outside of the distribution of a small amount of relief. An organization was perfected for looking after relief and an emergency hospital was provided with a physician in charge to care for the sick. General instructions for the patroling and cleaning up of the affected district were given and arrangements made for providing for the refugees. Relief work in this place was badly hampered owing to the lack of facilities for getting to the flooded district as all of the bridges were washed away. 115 families were made homeless; 18 bodies have been recovered and 21 are still missing. On April 5th the health officer reported that the sanitary conditions in the flooded district had been well established and were well in hand through the efforts of the local officials and the relief committee. Notices were promptly given to boil all water used for drinking and domestic purposes and this precaution was carefully observed. A considerable number of cases of contagious disease were found in the city but these were carefully looked after by the health officer.

Columbus. (181,511). The westerly portion of the city of Columbus was flooded to a depth reaching 18 feet, primarily by backwater from the river and by breaks in the levees bordering the Scioto River. Several districts were swept by swift currents and a large number of houses were destroyed or entirely removed by the water. 20,000 were made homeless and up to the present time 89 identified bodies have been found.

As soon as it was practicable to begin the work of reestablishment of sanitary conditions representatives of the State and City Boards of Health and of the city council met and cooperated in devising means for cleaning up the flooded area and preventing the inception of epidemics. The Secretary, Assistant Secretary and Chief Engineer made numerous examinations of the flooded district for the purpose of accurately noting conditions which might affect the public health. A number of samples of water from distribution system were examined in the laboratory and prompt reports were made to the local health department. The rules and regulations of the State Board of Health for reestablishing sanitary conditions and the prevention of epidemics, the reestablishment of quarantine were adhered to strictly by the city health department and at this writing it does not appear that any severe outbreak of disease in the flooded district is probably. A full detailed reported on the Columbus situation will be made later.

Circleville. (6,744). On March 29th an investigation was made at Circleville by Mr. W. H. Gould and Mr. W. H. Griffith of Toledo, volunteer inspectors. Owing to the elevation of the city but little damage was done except in the lowlands bordering the river. No loss of life was reported and but very little property damage.

Chillicothe. (14.508). An inspection was made by Messrs. Gould and Griffith at Chillicothe on March 29th-April 1st. On arrival March 29th they met the mayor, health board, health officer and council; and reported that the greatest need at that time was assistance in the form of clothing, cots, tents and money. It was advised that the relief of this kind the mayor should communicate with the Governor, which was done. With the assistance of the mayor, health officer and Dr. Oliver, who has had training in the Philippines, an organization was perfected, the city being divided into 12 districts under the health officer, with Dr. Oliver as chief sanitary officer. Sanitary police were placed in each district with instructions in regard to the policing of the district and measures to be taken to restore sanitary conditions. A sufficient amount of water for domestic use was secured from the wells used by the Meade Paper Company, and the public supply which had been under water was soon restored and made available for fire protection. The work at Chillicothe progressed rapidly and latest reports indicate that the work is being well done. Under advice of our inspector, the board of health issued several warning notices, especially with regard to the boiling of all water for drinking or other domestic use. A goodly supply of lime was received during the early part of the work and was generously used as a disinfectant. The property loss was very great and the expense to the city in restoring streets and other public improvements will be very heavy. It was estimated that one-half of the city was affected and upon the arrival of the inspectors a great part of the city was found to be under water. 17 bodies have been recovered, 200 homes were destroyed, and 500 people were made homeless. The question of the removal of dead animals was the first to be given consideration. There were no contagious diseases in the city at the time of the flood except one case of chickenpox and no other diseases have since been reported.

Waverly. (1803). An inspection was made at Waverly by Mr. Gould on April 1st. A great part of the village was under water and four houses were destroyed. No loss of life was reported to this office. The inspector met Dr. McCann, the health officer, and went over with him the measures to be taken to restore sanitary conditions. We have had no late reports from the health officer in regard to the progress of the work, and no contagious or infectious diseases have been reported.

Piketon, Wakefield, Lucasville. From Waverly Mr. Gould was taken by the superintendent of the Norfolk and Western Railroad to Portsmouth. Stops were made at Piketon, Wakefield and Lucasville. All of these places were damaged to a greater or lesser extent, but we have had no report of loss of life. There has been a considerable loss of property and the destruction of some homes in all of these places. The health authorities were advised in regard to the cleaning up of these villages as soon as the receding of the water would render this possible. At the time of the inspection there was still a considerable amount of water in the greater portion of these villages.

SANDUSKY RIVER WATERSHED.

Upper Sandusky. (3,799). On account of newspaper-reports of flood conditions at Upper Sandusky, a telegram was sent to the health officer on April 3rd asking for full information in regard to the effect of the flood and whether assistance was necessary to reestablish sanitary conditions. The health officer replied that sanitary conditions were fine and that no flood had reached them.

Tiffin. (11,894). In response to a telegram for information and an offer of assistance, the health officer of Tiffin, under date of April 4th reported that 19 persons had been drowned; 46 houses carried away and 564 houses damaged. The water works plant was flooded and the sewerage system badly damaged. Dead animals had been removed and there were no epidemics. He had issued an order to boil all drinking water. Preliminary cleaning up was being taken care of but they would need assistance later on. In was later learned that 30 lives had been lost.

Fremont. (9,597). On April 3rd a telegram was sent to Dr. E. L. Vermilya health officer at Fremont, asking for information concerning the effect of the flood and offering assistance. On April 4th the health officer wired that Mr. Griffith, special inspector for the State Board of Health, was in Fremont and would make a full report. On the same date Mr. Griffith telegraphed to the effect that conditions in Fremont were not serious, that an organization to restore sanitary conditions had been perfected by Dr. Girardot of Battery B, and the work was progressing. Labor was hard to secure and the mayor was unwilling to use compulsory measures. The health officer requested containers for sending water for examination. It was later reported that 4 persons lost their lives, 50 houses were destroyed, and 1000 people were homeless.

On receipt of a complaint from the health officer at Sandusky that the Fremont officials were disposing of wastes by dumping into the river, a request for information was sent to the health officer, but a reply has not as yet been received.

Bucyrus. (8,122). Health Officer McCrory reported that the lowlands bordering the Sandusky River were flooded and issued orders requiring the boiling of all water used for drinking purposes. This also applied to any wells or cisterns that might have been affected by surface water. Sanitary conditions were not affected to any great extent.

Bellevue. (5209). This city is not located on the watershed of the Sandusky River but is close to it. It was not affected by the flood, but presents the unusual condition of having been flooded by water from subterranean sources. The geology of this locality shows that it is underlaid with great fissures in the rock and there are numerous sink holes. The heavy pressure forced the underground water into the vaults, which are in a great many cases merely fissures in the rock, and caused these vaults to overflow into the low lying streets, leaving a sludge consisting of contaminated mud and fecal matter. Recommendations for the reestablishment of sanitary conditions following the floods were sent to the health officer, and also containers for sending samples of water from the public reservoirs. The health officer was instructed to call upon this office for assistance if needed.

Findlay. (14,858). Findlay is located on the Blanchard River, a tributary of the Auglaize, which empties into the Maumee River at Defiance. In answer to a request for information the health officer, Mr. Amos Beardsley, reported that while there was a large property damage and a great amount of unsanitary matter left in the flooded portion of the city, there was no present need of outside help in the matter of cleaning up. The local board of health took immediate action and with the hearty cooperation of the service department of the city and of all citizens, the city was fast returning to good sanitary conditions; that so far there had been no notable increase in contagious diseases and none was apprehended. The city water supply has been in fair shape throughout and surface wells are but little used. Should they be unable to care for the situation he would notify the State Board of Health.

Wapakoneta. (5,348). Wapakoneta is located on the Auglaize River, a tributary of the Maumee. The health officer, in answer to an inquiry as to conditions reported that about one-third of the cellars of the city had been flooded during the high water and in nine houses the water went over the first floor. Many cellars were flooded with water containing sewage. He had warned the people in the newspaper of the dangers of this condition and had advised them to thoroughly clean their cellars and have them fumigated as soon as dry enough and to have them treated with lime. The water was deep ground water and the flood water did not rise high enough to run into the receiving well, but may have filtered through the walls of the receiving well. He warned the people not to drink unboiled water, especially water from wells, and if it could not be boiled to add chloride of lime. Directions for making a stock solution of chloride of lime and how much of this to add to the drinking water were published in the paper. He asked that he be sent container so that a sample of the city water could be examined. There was no typhoid or dysentery in the city.

A personal investigation was made at Wapakoneta on April 8th by an inspector of the Board, when sanitary conditions were found to be good.

MAHONING RIVER WATERSHED.

Youngstown. (79,066). Telegrams of inquiry were sent to Youngstown, Niles and Warren on the Mahoning watershed. The health officer of Youngstown, under date of April 3rd, reported that the city did not suffer greatly and that sanitary conditions were well in hand, and stated that assistance at this time was not required.

Niles. (8,361). The health officer at Niles telegraphed that no assistance was needed and that everything was being well taken care of.

Warren. (11,081). Thomas B. Webb, clerk of the board of health at Warren, under date of April 3rd, telegraphed that on Monday they commenced work reestablishing sanitary conditions; that no funds were available, but they would spend from two to three thousand dollars and expect council to get the money on notes at the next meeting. They had one hundred and twenty-five men at work with teams and asked to be notified by wire how best to pay for this work.

He was advised that council was authorized to borrow whatever sum of money the board of health deemed necessary to prevent a threatening epidemic; that the Board should hold a special meeting, adopt resolutions declaring necessity and if necessary council, at a special meeting should provide for borrowing money. Attention was called to Sections 4450 and 5649-4 General Code for this authority.

A letter under date of April 2nd stated that a large part of the city was submerged and conditions favorable to an epidemic were present. The board of health at a special meeting on March 29th authorized the sanitary policemen to use all measures necessary in an emergency to prevent disease, and with this authority teams and men were employed to remove all debris and refuse. It is estimated that the probable cost of replacing closets, cleaning and disinfecting will reach $2,000. It was stated that the heaviest loss would be in furniture and other things that people will need to reestablish home life. It is estimated that from $10,000 to $15,000 would be required and that some state help would be appreciated. For answer to the proposition raised in the latter part of the letter, the clerk of the board was referred to the flood relief commission.

Forty-eight different places were visited by a representative of the Board, investigations being required on account of the recent flood.

On March 31st the mayor of Dresden requested the State Board of Health appoint John A. Bell health officer of that village; stating that the village had neither a board of health nor a health officer, and owing to flood conditions it was imperative that there should be a sanitary officer appointed at once. He had consulted Dr. Sutton, who referred him to headquarters.

The Secretary being in Dayton, looking after flood conditions there, the Assistant Secretary telegraphed the mayor as follows:

"John A. Bell hereby authorized to act as health officer for Dresden because of failure of village to provide board of health or health officer. The compensation of Mr. Bell and any expense incurred will be a charge against the village. Letter follows." A letter was then written to the mayor quoting this telegram and giving full instructions.

MAY MEETING.

On authorization of the President, Dr. Hasencamp, Dr. Warner and the Secretary attended the meeting of the National Association for the Study and Prevention of Tuberculosis in Washington, D. C., May 8 and 9, 1913.

The Secretary also attended the Congress of American Physicians and Surgeons and the American Association of Pathologists and Bacteriologists on May 6 and 7th, but not as a representative of the State Board of Health, and consequently not at the expense of the Board.

Many papers of interest along public health lines were presented at the congress of physicians and surgeons, among which may be mentioned the address of the president of the congress, Col. William C. Gorgas, on the subject of "Sanitation at Panama as it Relates to Sanitation in the Tropics Generally." The subject of the newer methods of the pasteurization of milk was discussed by Drs. Ford and Pryor, of Baltimore and Buffalo, respectively, and the subject of acute poliomyelitis by Dr. Simon Flexner of New York, and Dr. M. J. Roseuau of Boston.

Dr. J. F. Anderson of the Public Health Service, gave a general review of "The Problem of Typhus Fever in the United States." There was presented a large number of technical papers, dealing with the subjects of smallpox, rabies, syphilis, pneumonia, etcetera.

At a meeting of the National Association for the Study and Prevention of Tuberculosis, the president, Dr. Homer Folks, spoke of certain factors which operate against the anti-tuberculosis campaign in the United States. Among these he referred to the lack of adequate hospital management in certain tuberculosis hospitals; the Friedman alleged cure for tuberculosis and the seeming non-decline in the death rate from tuberculosis in certain sections of the country.

At a general meeting held on Thursday afternoon the subject for discussion was the "Anti-Tuberculosis Movement and its Relation to the Campaign Against Other Preventable Diseases". The discussion was opened by Dr. Hermann M. Biggs, chief medical officer of the city of New York.

It seemed evident from the discussion that much can be learned from the manner in which the anti-tuberculosis movement has been organized, that will be of value in combatting other infectious diseases.

The tuberculosis problem from the sociological and medical points of view was discussed by Professor John R. Commons of the University of Wisconsin, Dr. William Charles White of Pittsburg and Dr. H. R. M. Landis of Philadelphia. Dr. Frederick L. Hoffman of Newark, N. J., one of the leading actuaries of the United States, gave a very comprehensive discussion on "The Reduction in the Tuberculosis Death Rate 1871-1912". "The Relation of Industries to Tuberculosis" was discussed by Surgeon B. S. Warren of the United States Navy.

In the clinical section a large number of papers was presented dealing with the treatment of tuberculosis and in the pathological section papers dealing with recent pathological and bacteriological phases were presented.

One of the interesting propositions which was discussed was the relation of the tubercle bacilli to other acid-fast bacteria.

Dr. Krause and Dr. Baldwin of Saranac Lake, N. Y., have investigated this matter quite thoroughly, and it would seem from their investigations that there is a very close relationship existing between the various tubercle bacilli, the butter bacillus, the grass bacillus, the dung bacillus, the snegna bacillus and the chromogenic leprosy bacillus of Duval.

A very strong suggestion was made that the saprophytic acid-fast forms of bacteria above mentioned may be avirulent types of the tubercle bacillus.

Dr. John F. Anderson, director of the hygienic laboratory of the U. S. Public Health Service and chairman of the Board appointed by this Service to investigate Friedmann's alleged cure of tuberculosis, made the first authentic report of the Government's investigations. The report shows that Dr. Friedmann's claims are not substantiated, and the investigations show "That the vaccine of Dr. Friedmann is of such a nature as not to justify that confidence in the remedy which has been generally inspired by the widespread publicity it has been given".

Dr. Friedman failed to keep his promises made to our government investigators before coming to this country, and has in many ways obstructed their investigation.

Subsequent to the reading of Dr. Anderson's report the National Association for the Study and Prevention of Tuberculosis adopted a resolution, the tenor of which was that "no specific cure for tuberculosis has ben discovered that deserves the confidence of the medical profession and the public".

The resolution also emphasizes the duty of the public to continue the advocating of all present well tried agencies.

Typhoid Fever.

On May 2nd, the epidemiologist investigated an outbreak of typhoid fever at the Columbus State Hospital, where six cases and two deaths occurred between the 15th and 26th of April. His report may be found on a subsequent page.

Smallpox.

April 24, 1913. Dr. Cullen, medical inspector, visited Sylvania to investigate a case of smallpox. He found a man suffering with smallpox, who had come from Sand Creek, Mich., and who was boarding in a house with a man, his wife and one child. In another part of the house was living another family. He advised taking the patient to the pest house and vaccinating all persons in the house. The board of health was given necessary advice in regard to fumigating the house and enforcing vaccination.

April 30th, upon request of the health officer of Wooster, Dr. D. F. Banker, medical inspector, was sent to that city to diagnose a case of suspected small pox. He found a student in the university dormitory with the disease. The young man was removed to a vacant and well isolated house and an order issued requiring all students in the university to be vaccinated. No serious trouble is expected as this case was detected in good time.

Upon request of the health officer of Wayne Township, Clinton County, Dr. W. L. Dick, medical inspector, was sent to that township on May 1, 1913, to investigate smallpox conditions. He confirmed the diagnosis of smallpox, finding three cases. The board of health was not enforcing proper measures to prevent spread of the disease and was advised to have the board of education adopt a general order requiring the vaccination of all school children, making successful vaccination a condition of attendance at school. Full instructions were given in regard to quarantining, etcetera.

May 9th, upon request of the health officer of Barlow Township, Washington County, the epidemiologist was sent to investigate cases of suspected smallpox in the township. His report may be found on a subsequent page.

Proposed or Additional Water Supplies.

The engineering department has investigated proposed or additional water supplies in the following places: Albany, Athens, State Hospital, Baltic (site) East Cleveland, Frankfort, Galion, Nelsonville, New Straitsville, Pleasant City, Toronto, Wellston, and Wooster.

Reports have been prepared for consideration at this meeting on a proposed water supply for the Athens State Hospital, East Columbus, Frankfort, Rossford and Swanton; and additional water supply for Youngstown.

The engineering department recently inspected thre sites proposed for a new water supply for *Continental*. The first near the central portion of the village was found to be entirely unsatisfactory due to the proximity of built-up locality. The second site, northeast of the village and west of Toledo, St. Louis and Western Railroad is satisfactorily located but its topography is such as to furnish poor drainage. The third site located west of the village and north of the New York Central and St. Louis Railroad is the most suitable of the three and the authorities were advised to take steps to learn the availability of the water supply of this location, and before the proposed new supply could be submitted to the State Board of Health for approval it would be necessary to drill a well at the site selected and test same for quantity and quality of water available.

April 21st, a representative of the engineering department visited *Pleasant City* in reference to a proposed public water supply for the village. The site upon which a test well had been drilled was examined and samples of the water collected for analysis.

The examination indicates that the site selected is somewhat unfavorable owing to the fact that it is in the path of the sub-soil drainage from a portion of the village and the authorities were advised to select a site in an upstream direction from the village. The quality of the water obtained from the test well is similar to that obtained from a test well previously drilled in the valley of Buffalo Creek south of the village. The water is very hard and contains a high iron content which will render it unsatisfactory for household use. The authorities were advised, before preparing final plans, to drill a test well in the valley of Buffalo Fork in a westerly direction from the village.

April 30th the chief engineer visited *Toronto* and collected samples of water from a test well. The chemical results were very unfavorable and without treatment to remove the hardness and iron the supply would be unsuitable for general purposes. Owing to the fact that the bacteriological examination of the water had not been completed, it was impossible to discuss the sanitary quality. The mayor of Toronto was advised that before deciding upon the use of the water obtained from the wells, a study should be made by an experienced engineer to determine the feasibility and relative cost of installing a purification plant to improve the quality of the existing Ohio River supply.

The recent anlyses of proposed additional water supply for *Wellston* indicates that the physical characteristics of the water are somewhat improved since the last examination, due largely to the reduction in the turbidity and iron contents. The hardness of the water is excessive and the iron is still present in sufficient amount to be objectionable. The chlorine content will impart a briny taste to the water. The bacterial content is extremely high, as noted in samples previously examined. In view of the depth of the well the bacterial content is unusual. The authorities were advised to decide whether they would develop a ground water supply or install a water purification plant to purify the existing surface supply, and to inform the Board of their decision.

The city of *Wooster* is at present contemplating the installation of a new water supply and the chief engineer visited Wooster to make a general examination of the availability of a well supply in the valley of Killbuck Creek, west of the city. The authorities were urged to engage a competent consulting engineer to supervise the testing of the wells.

Existing Water Supplies.

A recent examination of the public water supply of *Greenville* indicated that the water derived from the wells in the valley of Greenville Creek is of good quality from a sanitary standpoint, although it contains an excessive iron content which renders its physical quality objectionable. It was learned that the quantity of the supply is inadequate during dry seasons and that considerable difficulty is experienced in obtaining sufficient water at such times. The availability of the emergency intake drawing water from Greenville Creek introduces the danger that an unsatisfactory supply may be utilized at times of shortage, and the city authorities were advised to avoid the necessity of the use of the emergency supply if possible, by drilling additional wells. They were also advised that it might be advisable for the city to have preliminary studies made relative to the installation of a surface supply.

Recent investigation of the public water supply of *Port Clinton* indicated the lake water to be admixed with river water. The water purification plant was operating satisfactorily and the effluent pumped into mains was safe for domestic use. The increased pollution of raw water was pointed out and the authorities were advised that steps should be taken to prevent undue pollution at the intake. They were urged to improve the method of disposal of sewage and to divert all sewage now discharging into Portage River by the construction of an intercepting sewer.

The fifth condition of the Board's approval of plans for the water purification plant at *Portsmouth*, granted September 12, 1912, provides for the submission of plans including various features of the purification plant. On March 4, 5, 6, and 13, 1913, detailed plans were received from the New York Continental Jewell Filtration Company, complying with condition five, of the Board's approval, and the director of public service of Portsmouth was advised that the plans were in general satisfactory but that definite plans and specifications of the devices as they will be installed at Portsmouth must be submitted.

Recent examination of the public water supply and water purification plant at *Toledo* revealed the fact that the plant is producing a satisfactory effluent but not receiving the careful analytical control that it should. Extensive changes in the pumping equipment at the high service pump station are being made and more storage capacity for filtered water will soon be provided by completing a 16,000,000 gallon clear water basin.

Proposed Sewerage and Sewage Treatment Works.

The engineering department investigated proposed sewerage for Buckeye Lake and for the West End, Conneaut; the site for proposed sewage treatment plant at Barberton, and proposed sewage treatment plant for the proposed Maplewood Beach Hotel, on the lake near Cleveland.

Reports have been prepared for consideration at this meeting on proposed additional sewerage for Conneaut and Lima, a system of sewers for District C. Lorain, sewerage and sewage treatment for Bexley and Westwood, and the treatment plant for the Maplewood Beach Hotel, near Cleveland.

In connection with the investigation of conditions resulting from the recent flood at *Bellevue*, by a representative of the engineering department, it was noted that the city is entirely without sewerage facilities, the prevailing method of disposing of wastes being through the so-called sink holes discharging the sewage into subterranean passages in the rock. The existence of these sink holes brought about the submergence of a considerable area of the city, due to back flow and the recurrence of such conditions can be avoided only by the provision of proper drainage for storm water and sewage. The city was urged to take up the question of installing a complete system of sanitary sewers and advised that an effort be made to interest the various counties involved in a comprehensive scheme of drainage for the city and surrounding country.

Existing Sewerage and Sewage Treatment Works.

Recent report on existing sewage treatment works at *Eaton* shows the plant to be in good condition.

The chemist at the water purification works at Columbus reported that the recent flood had washed away the sand beds at the disposal plant at the *Girl's Industrial School* and that the sewage was being bypassed directly from the sprinkling filters into the Scioto River. The Board of Administration was advised that immediate steps should be taken to provide for the installation of a plant for the disinfection of the sewage from the institution, such plant to be operated continuously until proper provision has been made for the treatment of the sewage. The Board was informed that it may be advisable to change somewhat the details of construction of the plant and that an engineer experienced in the design and operation of sewage treatment works should be consulted. We are informed that an engineer has been engaged to supervise the reconstruction of the plant.

On March 7th, while in Wapakoneta investigating proposed sewerage improvements, an inspection was made of the sewage treatment plant at the *Auglaize County Infirmary*, in response to a request of the prosecuting attorney of that county. Complaint against the effluent from the plant was made by a farmer who claimed that the stream receiving the effluent is rendered dangerous for cattle watering. At the time of examination it appeared that no nuisance was being caused by the effluent from the plant. It would appear that the plant is of ample size to treat the sewage from the institution to a high degree of purity if proper attention were given its operation. The screen appeared to be neglected but other portions of the plant seemed to be in good condition. Another inspection will be made in dry weather to observe the condition of the stream. A copy of the findings were sent to the prosecuting attorney.

Bense Propositions.

Investigations have been made and reports prepared for consideration on the water supply of Cambridge, and the water supply for East Liverpool.

Investigation of the pollution of Grand River by the wastes from the Diamond Alkali Company of *Painesville*, was made and it appeared that the discharge of wastes into the river although causing a visible nuisance, does not create conditions that are detrimental to health, as complained of by council in the resolution received April 16th. A report will be presented at this meeting.

April 23rd the Governor and the Attorney General approved the order requiring the city of *Ironton* to install and have in operation a water filtration plant of a design satisfactory to the State Board of Health on or before eighteen months from the date of the signing of the order by them, or by October 23, 1913. A copy of the order was sent to the mayor and council of Ironton on April 23rd, and on April 29th, at a special meeting, the council adopted a resolution requesting the State Board of Health to indicate the order of procedure in regard to the submission of plans, and a copy was transmitted to the Board. Council was advised to first authorize the employment of a competent and experienced engineer, and as soon as the plans are prepared to submit same to the State Board of Health for examination.

On April 28th there was received from the city clerk of Cleveland, a copy of a resolution adopted by the council of that city, April 21st, with reference to a report submitted to council by the board of health in 1912 on the public water supply of Cleveland. There was also received a letter, signed by two members of council, stating that because of the adoption of this resolution they had ceased their efforts to secure the signatures of ten per cent of the electors of the city and that they were transmitting a petition signed by from 5000 to 6000 of the said electors, asking that the State Board of Health investigate the public water supply. These members of council were notified that as the petition did not represent ten percent of the electors no action could be taken by the State Board. They were also informed, as was the city clerk, that the resolution of council did not appear to be in regular form and that the advice of the Attorney General would be asked. On submitting the mater to the Attorney General's department it was held that the resolution did not comply with the provisions of Section 1252 of the General Code, and the city clerk was notified that the resolution could not be considered as coming within the provisions of that section.

April 30th, the Governor and the Attorney General approved the order of the Board requiring the city of *Painesville* to install water purification works and have the same in operation before January 1, 1914. The order was sent to the mayor and council of Painesville on that date.

Mry 1st a petition was received from the health officer of *Woodsfield,* asking the Board to investigate the public water supply of that village, which is furnished by The Woodsfield Water Company. It will be recalled that last year the Board considered a report on this water supply and found that it was unsuitable for use and voted to require the company to submit plans for purification of the water supply prior to January 1, 1913. Such plans were approved January 22, 1913, and the Board adopted a resolution declaring the necessity for the installation of a water purification plant prior to January 1, 1914. Some difficulty has been experienced by the officers of the water company in obtaining funds necessary for the installation of the plant. The health officer was advised of the condition of the water supply and it was suggested to him that the Board would entertain a complaint made under the provisions of the Bense Act.

May 3rd, a resolution adopted by the council of the village of *Chardon* asking the State Board of Health to investigate sewerage conditions, was received and will be presented to the Board at this meeting.

May 10th a resolution, adopted by the board of health of *Cleveland* on May 8, 1913, was received; asking the Board to investigate the public water supply of that city and require the removal of all sources of pollution affecting said supply, or the purification of the present public water supply.

The six months time has expired since the Governor and the Attorney General approved the order requiring the village of *Plymouth* to purify the present water supply or secure a new water supply satisfactory to the State Board of Health; and the matter should be considered at this meeting.

Flood Inspections.

Since the last report flood conditions have been investigated by a representative of the engineering department in the following places: Ada, Athens, Bellevue, Bucyrus, Chillicothe, Coal Grove, Dayton, Freemont, Findlay, Green Camp, Hanging Rock, Ironton, Kenton, Lakeside, La Rue, Lima, Marion, Middleport and Pomeroy, Morrow, New Boston, Ottawa, Prospect, Sciotoville, South Lebanon, Tiffin, Upper Sandusky and Zanesville.

A full report on inspection of the flooded districts is to be published in the Monthly Bulletin.

April 28th the chief engineer approved the location and construction of cesspools for a high school building at Huntsville, received from Dr. F. A. Richardson, health officer, April 24, 1913.

State Inspection of Plumbing.

The State Inspector of Plumbing spent the month of April in Dayton, under the direction of the Secretary and Major Rhoads, U. S. Army chief sanitary officer, supervising the repairing of the sewage pumping stations, sewage ejectors and sewerage system, directing the placing of one hundred and four comfort stations and a house to house plumbing inspection. A detailed report of the work of the plumbing inspector in Dayton will be published in the Monthly Bulletin.

The Secretary has reviewed the report and receipts of the inspector and finds that fees were collected to the amount of $10.00.

Certificates of approval were issued to the owners of four buildings in Wapakoneta, one in Troy and to the Fulton County Infirmary.

Forty-eight different places were visited by a representative of the Board and fifty-seven investigations made.

JUNE MEETING.

On June 12th, while on his way to St. Paul, Minnesota, for the Conference of State and Provincial Boards of Health of North America, the Secretary visited the University of Chicago, and the Memorial Institute for Infectious Diseases, to confer with certain authorities relative to the public health exhibit which is now being formulated as rapidly as possible.

The President, Dr. Hasencamp, the Vice-President, Mr. Hartzell, and the Secretary attended the Twenty-eighth Annual Meeting of the Conference of State and Provincial Boards of Health of North America, held at the capitol building in St. Paul, Minnesota, June 13th and 14th.

The subjects under discussion were quite varied but important reports were made by several standing committees as follows:

1. Course of Instruction in Sanitary Science, by Dr. S. J. Crumbine, Secretary of the State Board of Health of Kansas. For some time the Kansas board has conducted a course of instruction in sanitary science in the University of Kansas. This course is aimed primarily for the instruction of health officers and attendance at the course is a prerequisite for appointment as health officer. In the opinion of your Secretary this is certainly a notable advanced step in public health administration.

2. Epidemic Anterior Poliomyelitis, by Dr. Mark W. Richardson, Secretary of the State Board of Health of Massachusetts. The report of this committee, of which your Secretary was a member, gave the progress which has been made in the investigation of acute anterior poliomyelitis during the past year, and it was recommended among other things that a period of isolation of at least four weeks be established in all cases of the disease.

3. Industrial Camps, by Dr. E. R. Kelley, Secretary of the State Board of Health of Washington. This committee report dealt largely with the importance of the sanitary conditions in industrial camps such as water supplies and proper disposal of excreta.

4. Organization of State Boards of Health, by Dr. H. N. Bracken, Secretary of the State Board of Health of Minnesota. This committee reported a model law for state board of health organization, and on close analysis it was found that this law, in the main, corresponds very closely

with the Ohio law providing for the organization and duties of the State Board of Health.

5. Transportation of the Dead, by Dr. W. R. Batt of the Pennsylvania State Board of Health. This committee reported upon the rules to be adopted by the various states governing the transportation of the dead. These rules are substantially the same as those adopted by the Ohio State Board of Health and are endorsed by the National Funeral Directors Association and the National Association of Baggage Masters. This problem has been one of the most vexing that has been before the conference for years, and its settlement was looked upon by all members with much satisfaction.

6. Venereal Diseases, by Dr. J. N. Hurty, Secretary of the Indiana State Board of Health. The recommendations of this committee were given in detail and will subsequently be published. It was evident to all members of the conference that this subject must be taken up for very careful consideration in every state, as this class of diseases is without doubt the most prevalent of all. In the near future the Secretary will present certain recommendations to the Ohio State Board of Health, having for their purpose the control of this group of diseases.

7. Trachoma, by Dr. J. W. Kerr, Assistant Surgeon General of the U. S. Public Health Service. This report had to do largely with an investigation of trachoma among the Indians, and is of great importance to some ten of the western states.

No reports were received from the committees on, Conservation of Vision, Hookworn Disease, Leprosy, Medical School Supervision, Pollution of Streams, Pellagra, Standards for Milk, or Railway Sanitation, although the last named subject was given consideration by the conference.

The subject of the income of executive officers was also discussed, and it was agreed that this information should be tabulated and placed in the hands of every state board of health.

On Sunday, June 15th, public health services were held in practically all of the Protestant churches in Minneapolis and St. Paul. Your Secretary spoke at the Fremont Avenue Congregational Church in Minneapolis, on the subject of "The Problem of Public Health."

On Monday, June 16th, the Eleventh Annual Conference of State and Territorial Health Authorities with the U. S. Public Health Service was held in Minneapolis. This conference was under the chairmanship of Surgeon General Blue, and Dr. H. T. Sutton was the official delegate from the Ohio board. The conference was also attended by the President, Dr. Hasencamp, and the Secretary.

Several matters of importance to the State Board of Health were considered, among them being a report of the committee on Morbidity Reports. Many suggestions were made for the improvement of the various methods of securing complete reports by the state authorities and great emphasis was placed upon the necessity of securing these reports in order to bring about efficient public health administration.

Reports were also received from committees on Typhoid Fever, Cerebro-Spinal Meningitis and Sanitation of Public Conveyances.

A report was also made by a committee, of which your Secretary was a member, upon Uniform Quarantine Procedure. This committee recommended that uniform procedures as to length of quarantine and method of handling various infectious diseases be adopted by the states, and that the method of placarding quarantined houses be made uniform.

The closing subject under discussion by this conference was How Can State and Territorial Health Authorities and the U. S. Public Health Service Cooperate in Greater Degree in Public Health Matters? The discussion of this subject was quite exhaustive and it was uniformly agreed that in order to efficiently administer the affairs of public health in this country it is absolutely essential to have close cooperation between the State and National authorities.

On Tuesday, June 17th, your Secretary attended the Section on Preventive Medicine and Public Health of the American Medical Association, and also visited the various exhibits on public health and preventive medicine; in order to secure valuable information for the formation of a public health exhibit for the Ohio State Board of Health.

Dr. Guy L. Kiefer, of Detroit, gave the chief address on Progress in Public Health Work, which detailed the work of a well organized health department and the general progress which has been made throughout the country.

Dr. J. W. Trask of Washington D. C., presented a paper on Morbidity Reports their purpose and present status; bringing out the following points: a knowledge of the occurrence of cases is essential for the control of disease by health authorities; all preventable diseases should be notifiable; such reports are necessary not only to the local but the state authorities as well; with the evolution of public health administration a workable system of morbidity reports for the entire country is practicable and would be of immeasurable value to direct immediate action in the control of existing disease and would furnish valuable data for purposes of study and add in many ways to our knowledge of epidemiology in its broader sense.

The need of whole-time health officers was presented by Dr. Harold B. Wood, of Rochester, Minnesota. The salient points were: The average community is not justified in entrusting its conditions which influence public health to a preoccupied man; a practitioner, hampered by medical competition and by the call of patients, cannot best serve the public; the appointment of a health officer should be made by or with the consent of the State Board of Health; public instruction is the chief aim; many dangerous transmitters of disease are not seen by physicians and not reported and these should be found and controlled; and, rural cases should be reported to the municipality which they may affect.

May 15th, Dr. Brown, the bacteriologist, addressed the Young Men's Christian Association at Otterbein University, Westerville, on the subject of "Some of the Influences of Bacteriology upon Clinical Medicine."

June 17th, Dr. Grube and the chief engineer visited Dayton to investigate the complaint of a nuisance caused by the hydraulics, and a report has been prepared for consideration.

The organization of the division of tuberculosis has been completed and necessary supplies and furniture have been secured from Mansfield Reformatory and from such other places as it was deemed necessary.

Minor changes have been made in the system of notification of infectious and contagious diseases which will enable the division to check and follow up with accuracy the semi-monthly returns made by local health officers.

Educational and publicity work has been confined thus far to the Monthly Bulletin. Plans are now being made for a fresh survey of the tuberculosis situation in Ohio together with a revision of the tuberculosis literature, which has been in use for several years.

The cooperation of the Cleveland and Cincinnati anti-tuberculosis leagues has been secured by loans of their exhibit material. This added to the collection of the Ohio Society for the Prevention of Tuberculosis will enable the division to make a beginning in constructing a traveling exhibit. The Columbus Young Men's Christian Association has given a large room in its building to be used this summer for assembling the exhibit. It is the intention to place a complete tuberculosis and general health exhibit at the Ohio State Fair in the fall.

During the month visits were made to Cleveland and Cincinnati for the purpose of securing exhibits from the local leagues.

The survey of occupational diseases for which an appropriation of $7,000 a year for two years was made, received its final authorization April 30th, and Dr. Emery R. Hayhurst assumed charge May 15, 1913. The first month's work has been concerned principally in organization.

To estimate the principal industries of the state, the avocations employing the most men, the location of those industries regarded as the more dangerous to health, statistics and information have been obtained from the state at large, for the larger cities from reports of the U. S.

Census Reports, State Department of Factory Inspection, State Department of Vital Statistics, Bureau of Awards, State Bureau of Labor, and from individuals connected with these departments who have more or less extensive knowledge concerning the industries of the state.

A reference library, dealing particularly with industrial hygiene and diseases of occupation, has been started principally for the information of those who will be interested in this survey as time progresses.

Office and clerical equipment have been provided for.

To meet the requirements of the act calling for the report of occupational diseases, after corresponding with about a dozen of the neighboring states, a blank has been prepared on the reverse side of which are printed extracts from the laws pertaining thereto and full instructions concerning the use of the blank. One hundred thousand of these blanks will be printed and they will be sent to all registered physicians in the state. It is the desire to supply every physician in the state with a small pamphlet showing the significance of occupational diseases and the classification of same.

Blank forms have been printed to enable investigators to report upon (1) establishment of hygiene and (2) cases of occupational disease.

Publicity must be one of the features of the survey in order to insure its success and an educational exhibit has been arranged in connection with the general exhibit of the State Board of Health. Although this will begin in a small way, since funds for such purpose are limited, it is hoped to have something ready by the time the Board's local exhibit is opened in Columbus in July. To help this feature along as well as the exhibit in general, the chief of the division, on the authority of the Secretary, made a trip to Chicago and visited the exhibits of museums of the Illinois Department of Factory Inspection, Chicago School of Civics and Philanthropy, Chicago Tuberculosis Institute, Chicago Health Department, and the Chicago Municipal Tuberculosis Sanitarium.

During the Chicago visit Dr. Ludwig Hektoen of Rush Medical College, University of Chicago, and member of the Illinois Commission of Occupational Diseases, was consulted for suggestions as to the conduct of the present survey.

It is planned to have something of interest in each issue of the Monthly Bulletin concerning occupational diseases, beginning with the June number, which is to contain one editorial, one adapted article, and one original article on this subject. Each month five or six trades or industries will be taken up and the diseases, causes, symptoms, diagnosis and prevention, which are known to be associated with such callings will be discussed.

Publicity for this division and its work is also to be accomplished through addresses and lectures at various public meetings. The first lecture will be given June 22nd, before the sanitarians of organized labor, at the request of Dr. J. H. Landis, health officer of Cincinnati.

June 9th, an inspection of the National Cash Register Company's plant at Dayton was made.

Since the last report, 72 inspections have been made by a representative of the Board, and 56 different places visited.

May 23rd, the epidemiologist, at the request of a local physician, investigated an outbreak of smallpox in Moxahala, a settlement of about 500 in Pleasant Township, Perry County. This settlement is on the T. & O. C. R. R., lines and is thus brought into communication with different points on the M. C. & C. R. R., in Washington County where smallpox has been prevalent. His report may be found on a subsequent page.

May 24th, in compliance with a request from the local board of health and a physician, the epidemiologist visited Rush Township, Champaign County, to investigate an outbreak of smallpox. His report may be found on a subsequent page.

At the request of the president, Dr. Hasencamp, Dr. James G. Cullen, medical inspector, was sent to Custar, Wood County, June 2nd, to inspect an outbreak of smallpox. He found that a man came to Custar about five weeks ago and one week later developed a rash which the attending physician diagnosed chickenpox. About the first of June this physician became very sick, developing a rash. The township people became suspicious and the physician finally reported the case as smallpox. While in bed with this rash well developed he allowed patients to call upon him and took no precautions until the board of health quarantined him. The board of health and the health officer were advised to vaccinate all exposed persons and to fumigate the barber shop in which the physician had been shaved. June 4th, a letter was received from a resident of Custar complaining that the physician and his daughter go in and out the placarded house and mingle with the public. The attention of the health officer was called to the matter and also to the fact that the case had not been reported as required by law.

June 7th, the epidemiologist visited Glouster, a village of 2500 in Athens County, to investigate the truth of a number of complaints received concerning quarantine regulations. His report may be found on a subsequent page.

June 9th, upon the request of the health officer, the epidemiologist visited Greenfield, to investigate a case of eruptive disease. His report may be found on a subsequent page.

On June 11th, Dr. James G. Cullen, medical inspector, was sent to *Alvordton*, to investigate suspected cases of smallpox. He found four families in which there were fifteen cases, all quarantined and doing well. However, a serious condition was caused by a restaurant keeper, Mr. Adams, whose wife and two children were ill with what he called chickenpox. The cases had not been seen by a physician and the man refused to allow the physician attending the other cases, or our inspector, to enter the house to make an investigation.

The health officer was advised that our inspector had established the diagnosis of smallpox and that his duty was to enforce all preventive or restrictive measures necessary to control the disease; that he must quarantine all cases and require the vaccination of all exposed persons. He was also told that where there is reason to believe a case of contagious disease exists in a house, or locality an investigation must be made by the health officer to establish the facts in the case, and when the health officer is not a physician he should appoint a physician to make this investigation and if a contagious disease is found, measures to prevent spread of the disease must be immediately enforced. The health officer was further advised to cause the arrest of any person who refused to obey his order.

June 14th, the mayor of Alvordton asked the State Board of Health to take charge of the situation. Accordingly, Dr. Boudreau, the epidemiologist, was sent to Alvordton on the 15th. His report may be found on a subsequent page.

June 18th, complaint was made that a man in the eruptive stage of smallpox had been going about the village *Powell*, Liverty Township, Delaware County, exposing many persons. Dr. Dick, medical inspector, was sent to the locality, and found that the disease had been prevailing in the township for two months, unrecognized by the physicians. There had been about twenty cases and there are two cases at the present time.

Dr. Dick found that there had been no health officer in the township for some time. The man at Powell who is now ill with smallpox is in the lumber business and has been going about the country. He operates a sawmill at *Carrol* and visited that village on Monday, eating dinner at a boarding house and transacting business at the bank thus exposing many persons to the disease. The health officer of Carrol was advised to hunt up all persons exposed to small pox and have them vaccinated. Instructions were sent to the trustees of Liberty Township, and they were told that a health officer must be appointed at once and every possible measure taken to prevent further spread of smallpox.

Proposed or Additional Water Supplies.

The engineering department has investigated a proposed water supply at Athens, the Athens State Hospital, Baltic, Centerburg, Cortland, Geneva (improvements), Kenmore, Pleasant City, Rossford, Toledo (The Wiltsie Realty Company); and a proposed improvement in the water supply at Wooster.

Reports have been prepared for consideration on a proposed new water supply for Athens State Hospital, Centerburg, and Frankfort, and additional water supply for Nelsonville and proposed water purification plant for Painesville.

The approval of the Board was asked of the Miller site as a location for proposed public water supply wells for *Baltic*. This site was investigated and found to be somewhat unfavorably situated, being within close proximity to dwellings which might give rise to the pollution of the water supply. The board of trustees of public affairs was advised to secure a more satisfactory location. It was suggested that the valley of Sugar Creek, south of the village had not been completely tested and that it would be advisable to drill additional wells to a greater depth to learn the availability of a sufficient supply. Also, that if the board desired to test the territory near the Miller site it would be advisable to select a location about 100 feet east of the easterly corporation line of the village, which would place the test well at a safe distance.

A preliminary investigation of a proposed water supply for *Cortland* was made. Two sites for wells were examined, the Richard site and the Philips site. The Richard site was, however, found to be an unsatisfactory location for water supply wells. The authorities were advised that it would be necessary to drill test wells and submit plans for the development of the water supply before any action could be taken by the Board.

On June 2nd one of the engineers visited *Kenton* relative to a proposed additional water supply. It was found that recent improvements in water supply equipment were made without submitting plans to the State Board of Health. It will be recalled that in January 1913 the Board disapproved the suply obtained from an open dug well near the pumping station and withheld approval of all the drilled wells near the pumping station, and the authorities were advised that a thorough study should be made of all available sources of water supply. They now desire to install an additional well near the pumping station to be pumped by a deep well pump, and have been advised that if a test well is drilled upon the water works property near the pumping station and a water supply of good quality obtained, the Board, will, no doubt, require the removal of all privy vaults and other sources of pollution.

A preliminary investigation of a proposed water supply for *New Straitsville* was made by the engineering department. While no definite plans have been bade it was demonstrated that the village desires to install supply wells in the built up portion of the village to provide for fire protection. The authorities were advised that the Board will require a water supply of a high standard of purity and that the wells should be located at least 500 feet from the nearest possible source of pollution.

As the community of *East Columbus* is not yet incorporated, and no formal request could be made from a municipal officer, to avoid delay in securing approval of plans for a proposed water supply, the consulting engineers requested an examination of the site for public water supply wells.

The investigation showed that the site which it is proposed to develop is unsatisfactory, being in close proximity to the built up portion of the community. The consulting engineers were therefore advised that the engineering department would not feel warranted in recommending approval of this site although a deferrization plant for the removal of excessive iron is proposed. They were also advised that if a ground water supply should be developed an entirely satisfactory location for the wells should be secured. It was suggested that it would be advisable to obtain a water supply from the city of Columbus, the supply of that city being of a high standard of purity.

Existing Water Supplies and Purification Works.

The existing water supply was examined by the engineering department at Chillicothe, Dayton, Loveland, St. Marys, and Youngstown; and the water purification plant at Elyria, Lorain, Niles, Vermilion and Warren inspected.

The general examination of the public water supply at *Dayton* was made with a view to determining its sanitary quality. Samples were collected at the pumping station and various points on the distribution system. The results of analyses of these indicated that the water at the time of sampling was safe for domestic and drinking purposes. The bacterial content was very low and the water was also free from intestinal organisms. In view of the great improvement in the quality of the water, the board of health was advised that it appeared to be no longer necessary to boil the water used for drinking and domestic purposes.

Upon examination of the water supply of *Loveland* it was learned that The Loveland Electric Ice and Water Company has failed to carry out the advice of the board that duplicate pumping machinery be installed in the dug well to avoid the necessity of pumping water from the Little Miami River during periods when the existing single unit is out of service. Examinations of samples of the water showed that the water supply was polluted and unsafe for drinking purposes. This contamination probably occurred as a result of the recent flood. It was learned that water from the river was pumped into the distribution system for several days with a result that the mains became thoroughly filled with river water and thereby contaminated. The examination also indicated that some flood waters reached the dug well. The attention of the company was called to the great importance of flushing the distribution system and thus removing all trace of river water. The company replied that they had cleaned the basin and flushed out the mains. The company is now in the hands of a receiver and all available funds were spent in making necessary repairs after the flood, so that it is not possible at this time for them to install duplicate machinery.

In accordance with interstate quarantine regulations of the U. S. and Public Health Service, which require that the water and ice furnished to passengers and employes in interstate traffic shall be subject to an examination and a certificate issued therefor, the Secretary directed the epidemiologist to visit Cleveland ,on request of the steamship companies, to investigate the drinking water furnished on the boats of the Cleveland and Buffalo and the Detroit and Cleveland lines. This inspection was made June 2nd and 3rd, and the epidemiologist's report may be found on a subsequent page.

Proposed Sewerage and Sewage Treatment.

The engineering department has investigated proposed or additional sewerage for Bellefontaine, Carey, Cincinnati, Farmdale, Greenfield, Kenmore, Port Clinton, Sandusky and Toledo (the New York Central Lines and the Interstate Stock Yards; and sewage treatment for Convoy (school), Copley (school), Willoughbeach Park, and a site for the Granville sewage treatment plant.

Reports have been prepared for consideration at this meeting on Copley, Cincinnati (additional sewerage), Farmdale, Granville, Sandusky and Willoughbeach Park; and on a sewage treatment plant for Akron, Bedford, Canton and Fostoria, and for proposed temporary sewage treatment plant for Sub-district No. 3, Main Sewer District No. 3, Lucas County, near Toledo.

In 1912 the Board approved plans for sewerage and sewage treatment for *Buckeye Lake Park*, attaching a condition that the installation should be made prior to January 1, 1913. A representative of the engineering department made a recent inspection of sewerage conditions at the park and found that no steps had been taken to install the improvements provided by the plans. The authorities were advised that if they attempted to utilize modern plumbing conveniences and thus create sewage, a nuisance would be created with the use of existing cesspools unless some provision be made for the disposal of the liquid wastes; and if it were found to be impracticable to properly dispose of the liquid wastes, it would be necessary for them to abandon entirely the use of modern plumbing conveniences and adopt sanitary privies as a substitute. They replied that the use of water in the toilets at the park had been discontinued and dry closets with the use of disinfectants would be used. Also that a tank wagon had been purchased and ground secured on which to dispose of the wastes.

Plans were submitted for sewage treatment works proposed in connection with sewerage for a portion of District No. 1, known as the Grandview Avenue Addition, *Conneaut*. Upon examination by the engineering department they were found to contain insufficient detail. Should coucil decide to provide a sewage treatment plant for the proposed sewers, they were advised to secure the services of an engineer experienced in the design of such plants to assist the city engineer in the work.

The chief engineer visited *East Liverpool* and inspected the East End District with reference to the necessity for sewerage. His report shows that the East End District is in an unsanitary condition, due to the absence of sewage facilities and that the necessity of proper sanitary sewers is apparent. However, in the installation of sewers for this district consideration must be given to the water supply of the city and before definite plans for sewering this district can be prepared some decision must be reached as to the improvement of the water supply. If the intake is to be relocated at a point above the city the plans for sewerage may provide outlets into the Ohio River opposite the East End District. If the water supply intake should be retained, however, in its present location, it will be necessary to divert the sewage from the East End District below the intake. The board of health (having requested the investigation) and the mayor and council were notified that as soon as the question of improvement of the water supply of East Liverpool has been decided the proposition of providing sewers for the East End District should be taken up immediately.

A plan was received for sewage disposal for the *Fulton County Infirmary*, but was of insufficient detail and information to make possible the preparation of a report to the Board. The plan had evidently been prepared without a thorough knowledge of the art of sewage treatment and the county authorities were advised that more detailed plans and more information relative to the proposed improvement should be submitted.

The sewage treatment plant has not yet been completed at *Lakeside*, owing to the unlooked for difficulties in excavation for the plant and the rainy weather. The authorities have been urged to use every effort to facilitate the work so that it may be completed before the summer season is well under way, and have also been reminded of the necessity of arranging for proper superintendence of the disinfection of the tank effluent. It was suggested that the man engaged to operate the water purification plant be detailed on this work.

Upon request of the *New Concord Real Estate Company*, one of the engineers visited New Concord to examine the contemplated sewerage improvements for the company's addition. The council and the real estate company were advised that it would be desirable to have a comprehensive system of sewers for the entire community installed, and that an effort should be made to effect co-operation in the construction of such a system before any steps are taken to construct sewers for the real estate company. They were also informed that the installation of incomplete sewerage systems is discouraged and that the Board in any case will insist upon proper disposal of the sewage which can best be accomplished by installing a system of sewers and sewage treatment works for the entire village. At the time of inspection it was observed that the nuisance caused by the misuse of the storm sewer on College Street still exists. The mayor and council was previously advised of the methods to be followed in abating the nuisance, and council was again urged to pass an ordinance prohibiting the misuse of storm sewers and requiring the removal of existing improper connections, and was advised that the installation of sanitary sewers would assist greatly in enforcing such an ordinance.

Existing Sewerage and Sewage Treatment.

Sewerage conditions were investigated at Elyria and Lorain and the existing sewerage at Niles, St. Marys, Warren and Youngstown by a representative of the engineering department.

On March 19, 1913, the chief engineer approved plans submitted March 17th, by the director of public service of Youngstown, for loss of head gages and controlling apparatus of the Venturi type to comply with the third condition of the Board's approval of a proposed enlargement of the water purification plant, granted August 15, 1912.

On May 9, 1913, the chief engineer approved plans showing revision in the design of the sewage treatment works for *Mantua*, received April 13, 1913, to comply with the fifth condition of the Board's approval, granted January 22, 1913..

In accordance with the resolution adopted at the May 22 special meeting of the Board, the Secretary issued the following approvals:

June 20th, approval of plans for a proposed sewage treatment plant for a centralized township school building at *Copley*, received from Mr. Vernon Redding of Mansfield, architect, on May 6, 1913.

June 20th, approval of plans for a proposed sewerage treatment plant for Willoughbeach Park, near Cleveland, received from Mr. R. Winthrop Pratt, consulting engineer, on June 7, 1913.

Bense Propositions.

June 3, 1913, a petition was received from the board of county commissioners of Mahoning County, asking the State Board of Health to investigate the condition of Honey Creek in Springfield Township, Mahoning County, caused by the discharge of wastes from the distillery of the Wire, Welsh and Company, located in that township.

June 5, 1913, a petition was received from the clerk of Marion Township, Franklin County, asking the Board to investigate the condition of Alum Creek in that township, caused by the discharge of seweage and other wastes from the Franklin County Infirmary.

June 7, 1913, the Governor and the Attorney General approved the supplemental order, granting an extension of six months time from May 13, 1913, when the village of Plymouth is required to purify the present water supply or secure a new water supply satisfactory to the State Board of Health, and the supplemental order was sent to the mayor and council on that date.

May 27th, the committee, Dr. Miller and the chief engineer, inspected the sewage disposal plant at *Lakewood,* about which complaint was made by the village of Rocky River.

State Inspection of Plumbing.

The State Inspector of Plumbing made his report upon the condition of the sewerage system, location of temporary comfort stations and a house to house inspection at *Dayton,* during and immediately after the flood of March.

From this report it appears that 8286 inspections were made; 2000 privies were washed away, leaving open vaults; 1000 premises have both privy vaults and sanitary sewer connections, and 3448 privy vaults are located on premises accessible to the city sewers. Thousands of water closets were repaired, and gas and water leaks were reported, which proved of material assistance in the work of cleaning the city.

In order to correct the existing conditions brought out by this report, a letter was addressed to the board of health of *Dayton* calling attention to certain sections of the State Code and recommending that these be adopted and enforced by the board of health. If was further recommended that the system of placing the inspection of privy vaults in charge of a district sanitary policeman be abandoned, and that the entire matter be placed in the hands of the chief plumbing inspector of the city and that he be directed to complete the work started, which will give the exact location and a record of every existing privy vault in the city. This of course will require additional deputy inspectors but such an inspection can be made at a cost of 10 cents per building, and the close relationship between plumbing inspection, the abatement of the privy nuisance, and the installation of sanitary plumbing fixtures, prompted such recommendation.

The State Inspector of Plumbing has reported upon his inspection of the *Franklin County Infirmary.* A copy of the report was sent to the board of county commissioners June 6th, and especial attention called to the recommendations which were as follows:

That the entire plumbing and drainage system (excepting the Tuberculosis Camp and the Administration Building toilet room) be overhauled and placed in good sanitary condition.

That the fixtures covered with corrosion be cleaned or replaced by fixtures of a modern pattern.

That the vitrified enamel iron washout water closet bowls be replaced by vitrified porcelain enamel syphonic or syphon jet bowls.

That a system of gravity or mechanical ventilation be installed which will change the air in these toilet rooms at least six times an hour.

That all floors in the toilet and bath rooms be provided with waterproof floor, the base made of non-absorbent indestructible waterproof material, viz: asphalt, glass, marble, vitrified or glazed tile, terrazzo or monolithic composition with a base not less than six inches high with a sanitary cove at the floor level.

During the month of May inspections were made in Columbus, Delphos, Franklin, Lima, Marion, Tiffin, Urbana, Wapakoneta, Woodstock and Zanesville.

Certificates of approval were issued to the owners of buildings in Lima and Wapakoneta, and to the Fulton County Infirmary.

An order was issued to a parochial school at Delphos, calling attention to the fact that work was being installed contrary to the Ohio Plumbing laws.

The Secretary has reviewed the report and receipts of the inspector for the month of May and finds that fees were collected to the amount of $55.00.

Plans were examined for work in a high school at Bowling Green and the county jail at Mt. Vernon.

Opinion of Attorney General.

Upon request, on May 15th, the Attorney General gave an opinion to the effect that in a city where a charter commission has been provided, such commission cannot deprive the State Board of Health of its rights as now guaranteed by the general law, to intervene and enforce the provisions of the statutes on health and sanitation. In case a chartered municipality should fail to provide for a system of enforcement of sanitary measures and clothe some one with the power to act therein, or should defy the State laws on the subject, the State Board of Health could intervene and enforce the general laws on the subject. He further held that all municipalities whether chartered or not, will be subject as to sanitary matters to the supervision of the State Board of Health, that local self-government cannot divest the State of its general rights through its board of health to look after the health and safety of its citizens.

JULY MEETING.

Since the last report six outbreaks of smallpox have been investigated, and one of typhoid fever.

June 19th, in accordance with a request of the health officer, the epidemiologist visited Quincy to investigate a case of suspected smallpox. His report may be found on a subsequent page.

June 20th, the epidemiologist was sent to Liberty Township, Delaware County, to confirm a diagnosis of smallpox. His report may be found on a subsequent page.

June 28th, Dr. Dick went to Range Township, Madison County, where he found 13 cases of smallpox in three families. He gave instructions to the local health authorities and proper measures are now being enforced to prevent the spread of the disease.

June 24th and 25th, in compliance with the request of the chief surgeon of the Detroit Toledo and Ironton Railroad, the epidemiologist investigated an outbreak of smallpox along the lines of this railroad. His report may be found on a subsequent page.

July 5th, upon request of the president, Dr. James G. Cullen, medical inspector, went to Sandusky County (Woodville) to consult with the health officer and a member of the board of health regarding cases of smallpox.

He found four cases, all mild. Eighteen persons had been vaccinated. The first case, a woman, it was thought, contracted the disease while on a visit in Toledo.

On account of the extremely hot weather some of the quarantined persons had been on their porches. Dr. Cullen advised that they stay in their houses. As people were all submitting to the regulations in force, no trouble was anticipated.

July 9th, Dr. W. L. Dick, medical inspector, was sent to Mt. Sterling. He found one case of smallpox, and that there had been two other cases, now recovered.

July 13th, in compliance with a request of the health officer, the epidemiologist was sent to Mt. Victory to investigate a supposed case of smallpox. His report may be found on a subsequent page.

July 8th, upon request of the health officer, the epidemiologist was sent to Barberton to investigate the source of an outbreak of typhoid fever. His report may be found on a subsequent page.

The Division of Tuberculosis has been working along the lines outlined in the last monthly report. The health exhibit is nearing completion. A detailed report of the work of this division may be found on a subsequent page.

In accordance with authority given at the June meeting, the Secretary has appointed several field inspectors for the Survey of Occupational Diseases for three months. A detailed report of the work ot this division may be found on a subsequent page.

Proposed or Additional Water Supplies.

The engineering department has investigated the proposed water supply at Kenmore, Hubbard, Magnolia, Nelsonville and Wooster, and the water purification proposed for Painesville and Steubenville. Reports have been prepared for consideration on Painesville and Steubenville, and also on an improvement in the water supply of Geneva.

The Galion Water Company, before consulting this department, drilled wells for an additional water supply in the south-westerly portion of the city of *Galion,* near John Street. Analysis of samples collected from well No. 3 did not show that the water was polluted but upon investigation it was found that numerous habitations are within 500 feet of these wells and as the new wells are a considerable distance from the existing pumping station, and it appears that a suitable location can be obtained at no additional expense, the company was advised that our engineering department would not report upon the proposed additional water supply until definite information is received that no other location would be considered.

Previous to the preliminary examination of the proposed new water supply for *Wooster,* a test well in the valley of Killbuck Creek was pumped continuously for twenty-six hours. The site of the test well appeared to be satisfactory but analysis of samples of the water showed an iron content sufficient to cause a marked turbidity and to make the water objectionable for domestic purposes. The director of public service was advised that some process for the removal of the iron should be provided and also that an extensive pumping test is desirable to obtain more accurate information as to the quantity of the supply.

Existing Water Supplies and Purification Works.

The existing water supply has been examined at Athens, Bellevue, Cedar Point, Chillicothe, Elyria, Gallipolis, Granville, Oakwood, Pleasant Hill and West Milton, and the water purification plants at Lorain and Vermilion were inspected.

Recent examination was made of the public water supply of *Greenfield,* and samples collected to demonstrate the quality of the water. The results of the examination of these samples indicate that the supply from the well bordering Paint Creek has characteristics similar to the water of the creek. Its physical quality is superior to the creek water as it shows no turbidity. The analysis shows that the water supply is polluted either by influence of Paint Creek or as a result of the general pollution of the underground water by the subsoil drainage from the village. The board of trustees of public affairs was notified that the water supply in its present condition is unsafe and should not be used without boiling. The authorities at Greenfield were again advised that a new water supply should be secured, and it was urged that council give the question immediate consideration.

The mayor of *New Lexington* made inquiry concerning the effect of oil wells upon the public water supply wells. He was advised that should council permit the drilling of oil wells near the public supply wells the greatest care should be taken to case off all water bearing strata which may have a connection with the public supply wells, to prevent contamination and that it should also be realized that there is a possibility that the supply wells may be drained.

Recent examination of the public water supply of *Vermilion* indicates that the water purification plant is not producing a satisfactory effluent. No appreciable bacterial removal is shown. The board of trustees of public affairs was advised that the water could not be considered safe in view of the present condition of the plant and that before a safe effluent can be produced it will probably be necessary to reconstruct the water purification plant. A complete report of the investigation is being prepared.

Proposed Sewerage and Sewage Treatment.

Investigations were made in regard to proposed sewerage at Castalia, Cleveland (proposed site for treatment of sewage from Walworth Run Sewer), Cincinnati (Duck Creek interceptor), Gallipolis, Geneva, Greenfield (extension of sewerage system), Toledo (Michigan Central R. R. Company) and the proposed sewage treatment at Akron, Mt. Vernon, Boardman Township, Mahoning County (school house) and the International Stock Yards at Toledo. The sewage testing station in Cleveland, and the sewage treatment plant in Columbus were visited and sewerage conditions at Elyria and Lorain were examined.

Reports have been prepared for consideration by the Board upon sewerage for Greenfield, Gallipolis, Toledo (Michigan Central Railway and International Stock Yards) and Port Clinton.

Bense Propositions.

A complaint has been received from the board of health of Canton, asking the State Board of Health to investigate the contamination of Nimishillen Creek by sewage and other wastes from the city of Canton.

A complaint has also been received from the board of health of Canton Township, Stark County, complaining of the conditions of Nimishillen Creek. caused by the discharge of sewage and other wastes from the city of Canton.

The following orders were prepared and submitted to the Attorney General on July 7th, 1913:

Requiring the city of Cambridge to install a new water supply of satisfactory quality, or a water purification plant to improve the quality of the existing water supply, previous to January 1, 1915.

Requiring the city of East Liverpool to install water purification works, satisfactory to the State Board of Health, prior to January 1, 1915.

Requiring the Woodsfield Water Company to install a water purification plant, of a design satisfactory to the State Board of Health, prior to January 1, 1914.

Requiring the village of Caldwell to provide a new water supply of satisfactory quality prior to November 1, 1914.

The engineering department has investigated the complaints and reports have been prepared for consideration at this meeting on the following:

Pollution of Honey Creek by the wastes from the Wire, Welsh and Company Distillery at New Middletown, Springfield Township, Mahoning County;

The contamination of the Cuyahoga River by the sewage and other wastes from the village of Cuyahoga Falls;

The pollution of the Little Cuyahoga River by the sewage and other wastes from the city of Akron;

The pollution of Alum Creek by the sewage and other wastes from the Franklin County Infirmary; and

The pollution of a tributary of the Chagrin River at Chardon.

Other investigations made were the pollution of Greenville Creek by the sewage of Greenville; the pollution of Chippewa Creek by the wastes from the plant of the Ohio Box Board Company at Rittman, and the condition of the sewage treatment plant at Lakewood.

June 27th the chief engineer, upon investigating the sewage treatment plant at Lakewood, found that nothing had been done by the council to improve conditions. The Rocky River below the outlet indicated that raw sewage had been bypassed into the stream at some recent date. The mayor and council were notified that in as much as the water supply of Rocky River is taken from the stream a short distance below the Lakewood treatment plant, the discharge of an imperfectly purified effluent constitutes a serious menace to the health of the residents of that village, and that a comprehensive improvement in the disposal of the sewage of Lakewood is immediately necessary. They were further advised that unless the village should take the initiative in this manner it will be necessary to again present the matter to the State Board of Health for action.

Fifty-seven inspections have been made by a representative of the Board and 46 different places visited, not includinfg forty-two inspections made by the State Inspector of Plumbing.

State Plumbing Inspection.

During the month of June the State Plumbing Inspector made inspections at Franklin, Fremont, Huntsville, Antwerp, Defiance, Elyria, Lima, Norwalk, Piqua and Wapakoneta. A total of 42 inspections were made during the month.

Certificates of approval were issued to owners of buildings at Antwerp, Franklin, Lima, Piqua and Salem.

Plans were examined and verbal recommendations given in regard to work in school buildings at Convoy, Elyria, Norwalk, Newark and Pemberville; in the Masonic Temple at Newark, and a mercantile and flat building in Fremont.

In the following places notice was sent that the plumbing must be installed in accordance with the State Plumbing Code: Parochial school at Delphos, school buildings at Lockland and at Spencerville, and a mercantile and flat building at Fremont.

The Secretary has reviewed the report and receipts of the State Inspector of Plumbing for the month of June, and finds that fees to the amount of $70. were collected.

Opinion of Attorney General.

The Attorney General was asked for an opinion on the legality of expenses incurred in remedying damage caused by the flood of March and April 1913, and the effect of an act passed April 10, 1913, known as the emergency act, giving the county commissioners certain authority in providing for the payment of such expenses. The case in question was that of a township which caused the removal of deposits left on private land by the flood, (believed to be inimical to the public health), after the county commissioners refused to cause such removal, and presented the bill to the commissioners for payment.

The Attorney General held that under the general laws of the state the expense of the prevention of a threatened epidemic in a township is to be borne primarily by the township, as a local health unit, and not by the county; and, the only change in the law with reference to the floods of March and April 1913, was to *permit* but not *require* counties to assume this expense in territories outside of municipal corporations.

He further held that the trustees, in their capacity as trustees, may under authority of Sections 3295 and 3939 General Code, provide the necessary funds. In the event, therefore, of the refusal of the commissioners to act under Section 2 of House Bill No. 640 (O. L. 103 p. 142), it becomes the duty of the township trustees to act and they having incurred obligations by removing the dangerous, unhealthful deposits from their township must provide funds therefore, either by tax levy or by borrowing money; or, if they have a sufficient amount in the treasury of the township to the credit of the health fund not appropriated for any other purpose, it is their duty to pay the claim which they have incurred as a board of health out of such money.

SEPTEMBER MEETING.

The Secretary has inaugurated a staff meeting, held Monday morning of each week, when the chiefs of the various divisions meet for the purpose of discussing the various problems coming up for solution, and for improving the general efficiency of the divisions. A course of study in preventive medicine and hygiene has been taken up, which will extend throughout the winter and will serve to familiarize all with the various health problems.

On two occasions the Secretary addressed the students of the summer schools at the Ohio State University, on public health problems.

The President, Dr. Hasencamp, Dr. Brown, member, and the Secretary attended the Fourth International Congress on School Hygiene in Buffalo, N. Y., August 25th-30th, 1913, and a report of this meeting will be made in the September monthly report.

Dr. Brown presented a very interesting paper before the Congress on "Dental Phases of School Hygiene and Other Public Health Problems", which will be printed in the *Monthly Bulletin* of the Board, as well as in the transactions of the Congress.

August 24th was observed in Buffalo as Public Health Sunday, and the various pulpits in the city were occupied by public health workers from the different parts of the United States. Your Secretary spoke in the Riverside Methodist Episcopal Church.

Scarlet Fever.

July 19, 1913, the epidemiologist visited Bokes Creek Township, Logan County, to investigate an outbreak of scarlet fever. His report may be found on a subsequent page.

Typhoid Fever.

July 30th, the epidemiologist was sent to Troy to aid in preventing the spread of typhoid fever. His report may be found on a subsequent page.

Smallpox.

The epidemiologist was sent to London July 18th, to investigate smallpox and found three persons who had had the disease but were not quarantined. His report may be found on a subsequent page.

July 29th, upon request of the health officer, the epidemiologist visited Pittsburg to investigate smallpox. His report may be found on a subsequent page.

August 12th, Dr. James G. Cullen, medical inspector, investigated smallpox at West Toledo, Washington Township, Lucas County. He found the patients to be a man of 25 and his four-months-old daughter. These cases had been under a physician's care since the 9th. A girl from Toledo who had been visiting the family had some skin eruption for three weeks, but did not consult a physician and the eruption disappeared. It is now thought that she had smallpox. The cases were mild and proper precautions were taken to prevent further spread of the disease. Neither of the patients had been vaccinated.

Trachoma.

August 2, 1913, the epidemiologist visited Washington Township, Holmes County, to investigate hookworm disease. His report may be found on a subsequent page.

DIVISION OF TUBERCULOSIS.

A report of the work of this division may be found on a subsequent page.

DIVISION OF OCCUPATIONAL DISEASES.

A report of the work of this division may be found on a subsequent page.

Proposed or Additional Water Supplies.

The engineering department has investigated the proposed water supply for Athens, Canal Dover, Colonial Heights, (Akron), Crooksville, Marysville, Midvale, New Philadelphia, Ravenna, Steubenville, Toronto and Wooster.

Reports have been prepared for consideration at this meeting on the supply proposed for Hubbard, Magnolia, Ravenna and Steubenville.

An investigation was made of a test well at *Baltic* drilled at the site approved by the Board in April 1912. It appears from the analysis of the sample recently collected that the water is of satisfactory quality for domestic use. The only objectionable characteristic is a high iron content which causes a turbidity in the water sufficient to stain plumbing fixtures. The attention of the village officials was called to the fact that according to one of the conditions of approval plans shall be submitted to and receive the approval of the Board before contracts for the installation are awarded.

The proposed site for public water supply wells at *Crooksville* was examined, located in the hills east of the village. The authorities were advised that surface conditions would indicate that a well at this location should be satisfactory, there being no apparent contaminating influences in the immediate surroundings, but the question of whether or not a sufficient supply of water satisfactory in mineral characteristics could be obtained from wells at this site would have to be determined by drilling and testing the well.

Recent inspection was made of a new well proposed as a source of water supply for the *Tuscarawas County Infirmary.* The well was found to be in a very unsatisfactory location. The existing well, while not entirely satisfactory, is in a far more suitable location. The Superintendent of the institution was advised that a well be located in a general northerly direction from the institution, either on the slope of the hill or at its summit, and as soon as a location had been decided upon a sketch should be submitted before drilling the well.

An examination was made of a well recently installed at *Westerville,* to be used as an additional water supply for the village. The analysis indicated that the water obtained from the well is satisfactory in its bacterial content and contains a very small organic content. The mineral characteristics, however, are extremely objectionable and would render it unfit as a public supply. The hardness of the water is excessive and it contains a large amount of sulphuretted hydrogen which gives it a decided odor. The village officials were advised that the water on the whole should be classed as one unfit for use, regardless of its satisfactory sanitary quality.

Preliminary examination was made of the proposed water supply for the Ohio Reformatory for Women at *Marysville* and a report furnished the State Board of Charities. It was found that the water is very objectionable, due to its excessive hardness and iron content. The bacterial analysis was not entirely satisfactory, owing to intestinal organisms present in a 10 cubic centimeter portion. The Board was advised to make a further survey to learn the availability of other sources of supply of more satisfactory quality.

Existing Water Supplies.

The existing water supply has been examined at Barnesville, Bellevue, Bradford, Camp Perry, Continental, Findlay, Gibsonburg, Kenton, Leipsic, Newark, Norwalk, Put-in-Bay, Rockford, State School for the Blind (Columbus), Toledo, Vermilion, Westerville and Zanesville.

Recent examination of the water supply at *Bellevue* indicates that the supply is contaminated and unfit for drinking purposes in its raw state, and the health officer was so notified. An earlier inspection revealed the fact that during the first part of June the reservoirs, under the direction of the health officer, were treated with calcium hypochlorite to improve the quality of the water, and as learned from the examination by our engineering department the method of treatment practiced was improper and no beneficial results were obtained.

Recent examination of the public water supply of *Chillicothe* indicates that the supply is of satisfactory quality for drinking purposes. The bacterial content in the samples examined was low and no intestinal organisms were found in 1 cubic centimeter portions.

From recent inspection of the water supply at *Cuyahoga Falls* it was learned that considerable trouble is experienced in obtaining sufficient water from the existing wells. The attention of the authorities was called to the importance of securing advice from a competent engineer relative to an adequate water supply, and it was suggested that they recommend to council that immediate steps be taken to have a survey of available sources of water supply made.

Recent examination of the water supply of *Gallipolis* indicates that the supply is of good quality. The physical, chemical and bacteriological characteristics were all favorable.

The water supply of *Kenton* has been investigated. Examination of samples taken at the pumping station and from points on the distribution system indicates that the water was satisfactory at the time of sampling. The chemical and bacteriological findings did not indicate the presence of organic pollution.

An investigation recently made of the water supply of *Oakwood* shows that the public supply wells are becoming surrounded by residences. The most objectionable feature in the vicinity of the wells is the sewer of the Dayton State Hospital, which passes the wells within twenty to thirty feet. It was learned that this sewer is in a leaky condition and that the subsoil is polluted in its vicinity. Whether or not this pollution affects the quality of the Oakwood supply has not yet been determined. The Oakwood Water and Light Company, owners of the supply, were notified that considering the general location of the wells and especially the proximity of the sewer mentioned, the supply cannot be considered safe and its deterioration at any time may be anticipated. The water company was also advised, that an improvement should be made, either by obtaining water from the city of Dayton or securing a new location for wells at Oakwood.

Report upon recent examination of the water supply of *Pleasant Hill* states that the supply was found in good condition notwithstanding the fact that the equipment suffered considerable damage during the flood of last March. Analysis showed the quality to be satisfactory from a sanitary standpoint and that it contains no objectionable characteristics except an abnormally high iron content, the iron being sufficient to cause turbidity and to stain plumbing fixtures.

A recent inspection was made of the existing water supply at *St. Mary's*. The results indicate that the supply is of fair quality from a sanitary standpoint. Its mineral characteristics are objectionable, but these do not affect the sanitary quality of the water. The authorities were advised that in spite of the fact, the supply is not thought to be entirely safe, as two of the supply wells and receiving well were flooded in March and no attempt has been made to remove the mud deposits from the receiving well. The city officials were also advised that the general location of the supply wells is not favorable as it is one of the lowest portions of the city and the immediate surroundings are distinctly insanitary, and if the wells are to be retained in their present location it will be necessary to improve the surroundings. It was further suggested that the receiving well be thoroughly cleaned to remove deposits which have accumulated since its installation, and unless it is found possible to protect the wells in their present location it would be better to abandon them and secure wells more favorably located.

The results of recent examination of the public water supply at *Springfield* show that at the time of sampling, Buck Creek was polluted and contained intestinal organisms. The various samples taken from the water works collecting well, reservoir and taps on the distribution system contained objectionably high numbers of bacteria, although colon bacillus was not found in 10 cubic centimeter portions. The results indicated that the supply should be viewed with suspiciion.

The results of recent examination of the water supply at *West Milton* indicate that the supply is of good sanitary quality and satisfactory for domestic use. The sanitary conditions in the vicinity of the spring were found to be distinctly unsatisfactory. The cesspool and privy near the dwelling which is located over the spring are in need of cleaning and unless properly attended to may cause the pollution of the water supply. The spring, moreover, is exposed to accidental contamination to prevent which a substantial cover should be provided. The village authorities were notified to give their immediate attention to the conditions surrounding the spring and to notify the Board when this has been done.

An examination of the water supply of *Findlay* was made and a report furnished the board of health. Samples of the water were collected by one of our engineers from points on the gravity conduit and the main discharge line from the pumping station, and by the health officer from various points on the distribution system. The analyses indicated that the water obtained from wells and spring is of a satisfactory quality. Intestinal organisms were found in samples from the conduit and the main discharge line from the pumping station, indicating that contamination reaches the supply in its passage through the conduit. As a whole the analytical results indicate that the quality of the water supply as delivered to consumers is not entirely satisfactory. Upon receipt of a plan and profile of the gravity conduit a more thorough study of this feature will be made.

Existing Water Purification Plants.

Inspections were made of the water purification plants at Camp Perry, Port Clinton and Rocky River and of the plant under construction at Alliance.

A report upon an examination of the water purification plant at *Elyria* indicates that the plant is being properly operated and that good results are being obtained. The rather high bacterial content was probably not indicative of the efficiency of the filters, the growths of organisms no doubt occurring during shipment. The city authorities were notified to have the chemist pay particular attention to bacterial examination of samples to detect failure in efficiency in the plant.

A report upon an examination of the water purification plant at *Lorain* revealed the fact that the plant is in good condition and being efficiently operated. The analyses were satisfactory in every respect with the exception that the colon bacillus was found in 10 cubic centimeter portions of the filtered water. The superintendent of the plant was advised to examine regularly 10 c. c. portions of the filtered water and if colon bacillus is detected regularly in this portion, it will be necessary to make provision for higher bacterial efficiency.

The health authorities of *Mansfield* requested advice relative to the treatment of the public water supply. They were advised that in the opinion of the engineer of the State Board of Health the water supply of Mansfield is of good quality as obtained from the wells, but that the open reservoir offers opportunity for contamination. They were also advised that it would be unwise to attempt the use of calcium hypochlorite to disinfect the reservoir, as there is likelihood of excessive quantities being applied in certain portions of the reservoir, and that the proper procedure would be to apply the chemical as a solution and not in solid form. The health authorities were further advised to consult an expert in water treatments before applying a disinfectant.

It was learned upon recent examination of the water purification plant at *Port Clinton* that only one of the filter units was being used, it being operated at a rate sufficient to filter the discharge from one of the raw water pumps. The village authorities were notified that the excessive rate of filtration is no doubt detrimental to the filter and the quality of the effluent, and that orders be immediately given to provide for more efficient operation of the filters by using at least two filter units at all times. In event that the rate controllers are not properly controlling the rate of the filters it was suggested that the village officials take up the question with the manufacturers with a view to rectifying the trouble.

Examination of the water purification plant at *Rocky River* was made. The analytical results indicate that the effluent from the filter is improperly purified and unsafe for domestic use. The Rocky River Power and Light Company was notified that the water should not be used for drinking purposes without boiling. The company was advised to install an intake into Lake Erie or to abandon their plant and obtain a water supply from the city of Cleveland. The health officer was also advised of the unsafe condition of the present water supply and asked to bring the matter to the attention of the village authorities.

Proposed Sewerage and Sewage Treatment.

Investigations were made relative to proposed additional sewerage for Canal Dover, sewerage for Ripley and Vermilion, sewerage and sewage treatment for Bucyrus, Epworth Park at Bethesda, Columbiana, Kenmore, New Philadelphia and a school building at Newark.

Reports have been prepared for consideration at this meeting on proposed sewerage for Cincinnati (Mill Creek Valley), and Wapakoneta, the sewage treatment plants at Columbiana and New Philadelphia.

Existing Sewerage and Sewage Treatment.

An investigation has been made of the existing sewerage at Monroeville and Westerville; sewage purification plants at Camp Perry, Columbus, Medina and Lakeside and sewerage conditions at the Congress Lake Club near Ravenna, Leipsic, Ashville and Vermilion. The plants under construction at New Berlin and Salem were inspected.

A recent examination of the sewage treatment plant at *Alliance* was made. It was learned that the sedimentation tanks were being used as septic tanks and were producing a black colored and foul effluent. These tanks were designed to be used as sedimentation tanks and should be cleaned frequently to avoid septic action. The city officials were advised that unless better distribution of sewage upon the final filters is secured, a rapid deterioration will result. It was also suggested that the question of improving the plant be taken up with the consulting engineer in order that improvements may be provided before the plant has materially suffered.

In connection with a recent examination of the water supply at Oakwood, the conditions attending the disposal of sewage from the *Dayton State Hospital* were also investigated. It was learned that the sewage from this Institution is discharged without treatment into the Miami and Erie canal, thereby increasing the pollution of that watercourse. Some improvement should be made to avoid this contamination and the Ohio State Board of Administration and the Superintendent of the hospital were advised to secure the services of a competent sanitary engineer relative to the feasibility of connecting the hospital sewer with the Dayton sewerage system or installing sewage treatment works.

Upon recent investigation of sewerage conditions at *Epworth Park* at *Bethesda*, it was found that a tank had been installed to receive sink wastes from cottages and that later it was proposed to discharge closet wastes into this tank.

The construction of the tank was found to be impracticable as too impervious walls effectually prevent the passage of sewage through the tank and the overflow into a small stream passing through Bethesda will undoubtedly cause a nuisance. The authorities were advised that this tank should not have been constructed without the approval of the State Board of Health and that it would not be approved unless a secondary treatment for the overflow is provided.

The chief engineer examined the conditions attending the disposal of sewage at the *Congress Lake Club* near *Ravenna*. It was found that the sewage is discharged into a sedimentation tank from which it flows in intermittent doses to a low area east of the club house and bordering the Congress Lake outlet. Another sewer outlet was found a short distance south of the club house from which kitchen wastes are discharged directly into the lake outlet. In the vicinity of the sewer outlet a local nuisance was being created. The plans for the sewerage for this club were never submitted to the State Board of Health for approval and a letter was addressed to the president of the club and to the engineer, stating that the Board would insist upon plans being submitted and that proper methods of disposing of the sewage from the club house be provided.

The sewage treatment plant at *Lakeside* was recently examined and it was found that some trouble had been experienced, due to odors caused by the tank, probably caused by faulty construction, rather than improper treatment of the sewage. The superintendent was advised that as the sewers have been built in a haphazard manner, it would be reasonable to suppose that the sewer lines have uneven grades and thus prevent a free and rapid flow. The superintendent was also advised that the provisions of the Building Code had been violated in providing plumbing for the cottages, house stacks having been omitted; and that these conditions all contribute to produce a stale sewage and attendant offensive odors.

A recent inspection of the sewage treatment plants at *Medina* revealed the fact that both plants were producing an improperly purified effluent which caused pollution of the streams. It was learned that a secondary sedimentation tank had recently been installed at the northerly plant and that it is intended to provide this feature at the southerly plant. The authorities were advised that proper treatment of the sewage can be secured only by using fine grain intermittent filters as final treatment and until this is provided the plants may be expected to cause complaint.

A recent inspection of the sewerage system at *St. Mary's* revealed that considerable damage was done during the March flood. Instead of the waters flowing into the system as was supposed by the city engineer the sewage was flowing out. The purification plant was also in bad condition due to clogging of the filters by deposits of clay. The matter was taken up with the authorities and they were urged to have council provide funds for repairing damages and for the proper maintenance of the sewers and sewage treatment works.

The engineering department recently investigated the sewage treatmnt plant of *Salem*, which is in progress of construction. It was found that the plant is almost completed and has been generally well constructed. Filter No. 8 was found to contain only 18 inches of sand whereas the plans call for a depth of 30 inches. The city officials were advised that this unit should not be used until the sand is brought to the level shown on the plans. They were also advised that before any of the filters are used the sand surface should be carefully leveled and the distributers placed to secure uniform operation. Also that during the first year the plant will require considerable attention to maintain a level surface on the beds, and the city should engage a competent superintendent to have charge of the operation of the plant.

Upon request of the board of health of *Vermilion* an investigation of the sewerage conditions in the village was made, and it was found that insanitary conditions exist as a result of the pollution of ditches in various portions of the village. The necessity of a proper system of sanitary sewers was apparent, the board of health was advised to request an investigation under Section 1249 of the General Code, known as the Bense Act.

July 28, 1913, plans showing the development of the proposed water supply for *Rossford* were submitted, complying with the first and fourth conditions of the Board's approval of June 26, 1913.

Bense Propositions.

July 30, 1913, petitions were received from the board of health of Toledo asking the State Board of Health to investigate the pollution of the Maumee River by the sewage and other wastes from the villages of *Maumee* and *Perrysburg.*

In accordance with actions taken at the July 23, 1913, meeting, orders were prepared and submitted to the Governor and Attorney General requiring the city of Toledo to install and have in operation within two years from date of the approval of the order, the necessary intercepting sewer the sewage treatment works to correct the conditions in Swan Creek and in Ten Mile Creek; and requiring the village of Cuyahoga Falls to install and have in operation prior to January 1, 1915, the necessary sewers and sewage treatment works to correct the conditions in the Cuyahoga River complained of by the board of commissioners of Summit County. These orders were approved by the Governor and Attorney General August 25, 1913, and were sent to the proper authorities August 30, 1913.

It was learned that on August 18, 1913, the council of *Caldwell* passed an ordinance to issue bonds in the sum of Eight Thousand Dollars to purchase land and erect buildings and pumping machinery to improve the water supply of the village.

The attention of the authorities was called to the Board's order issued July 22, 1913, requiring the village to install a new water supply and they were advised that the Board's order must be obeyed and before any construction work is done the approval of the State Board of Health must be secured.

Sanitary Conditions.

In company with the health officer of *Lakeview,* one of the engineers made an inspection of the summer resorts surrounding *Indian Lake.*

The general sanitation of the resorts was found to be very unsatisfactory and a universal disregard of proper health conditions observed.

A health officer had been appointed to look after the maintenance of these resorts and he was furnished a copy of the report of our engineering department and was advised to make a thorough inspection of all points near the lake and order the immediate correction of the various improper conditions noted.

An investigation was recently made of an alleged nuisance at *Castalia.* It was found that a small area of land near several dwellings is improperly drained and during wet weather is covered with water which becomes stagnant, but is removed by evaporation or absorption. The intermittent pond was practically dry at the time of the examination and no serious nuisance was evident. It was possible, however, that just cause for complaint would result when the pond contained stagnant water.

The health officer was advised that if a nuisance exists, it may be abated by the installation of a proper drain or by filling in the area ponded. and that this was a matter coming entirely within the jurisdiction of the local authorities.

Complaint was made of a nuisance at *Jefferson,* caused by stagnant water on low land. An investigation was made by one of the engineers. No decided nuisance was found to exist but the mayor and council were advised to take steps to fill the depression and thus prevent the pooling of surface drainage.

State Plumbing Inspection.

During the month of July, forty-four inspections were made by the State Plumbing Inspector in Bluffton, Dayton, Delphos, Elyria, Findlay, Lima, Marion, Newark, Norwalk, Oxford, Sidney and Wapakoneta.

July 12th and 13th, he attended the convention of Journeymen Plumbers in Toledo and made an address.

July 28th, he addressed the plumbers of Dayton upon the revisions in the State Code.

Owners of buildings in Ashland, Boardman, Brewster, Castalia, Greenfield and Norwalk were notified that the plumbing must be installed in accordance with the Code.

Plans were examined and verbal recommendations made for plumbing in a cold storage house and an office building in Lima, and in school buildings in Ashville and Findlay.

The Secretary has reviewed the report and receipts of the State Inspector for the month of July, and finds that fees to the amount of One Hundred and Five Dollars were collected.

In all there were 292 inspections made by a representative of the Board. One hundred and seventy-one of these were made by the Division of Occupational Diseases; fifty-one by the Engineering Department; forty-four by the State Inspector of Plumbing; twenty-one by the Division of Tuberculosis, and five by medical inspectors. Sixty-eight different places were visited.

OCTOBER MEETING.

The President, Dr. Hasencamp, Dr. H. C. Brown, member, and the Secretary, Dr. McCampbell, attended the meeting of the Fourth International Congress on School Hygiene, August 25-30, 1913, at Buffalo, New York.

Over two thousand delegates from the United States and foreign countries attended this meeting.

The work of the Congress was divided into three sections, as follows:

SECTION 1. The hygiene of school buildings, ground, material, equipment, and upkeep.

SECTION 2. The hygiene of school administration, curriculum, and schedule.

SECTION 3. Medical, hygienic, and sanitary supervision in schools.

The Congress was held under the presidency of Dr. Charles W. Eliot, president emeritus of Harvard University.

Several hundred interesting papers dealing with the various phases of school hygiene were presented and will be published in the transactions of this congress in the near future.

Particular interest attached to the discussion on the subject of Mental Hygiene, Sex Hygiene, Mouth Hygiene, Open Air Schools, Medical Inspection of Schools, the Sanitary Construction of School Buildings, Directed Play and Athletics, School Clinics and various related subjects.

Dr. H. C. Brown presented a very important paper on the subject of "Dental Phases of School Hygiene and Other Public Health Problems."

Dr. Brown and the Secretary also took part in a Symposium on Mouth Hygiene at Elmwood Music Hall one evening during the Congress. This was undoubtedly the largest gathering of people interested in this subject that has ever been held in this country or abroad.

While attending the Congress in Buffalo, the Secretary, on August 24th, delivered an address at the Riverside Methodist Episcopal Church on the subject of "Problems of Public Health." A number of the churches in the city of Buffalo devoted their morning hour to this and related subjects, the addresses being made by various public health workers in the United States.

The president, Dr. Hasencamp, vice-president, Mr. Hartzell and the secretary, Dr. McCampbell, attended the Forty-first Annual Meeting of the American Public Health Association, held in Colorado Springs, September 9-13, 1913.

The Association was under the presidency of Dr. Rudolph Hering, of New York City, and the meetings were held at the Antlers Hotel.

Many papers of interest were presented. Particular attention should be directed to the papers presented in a Symposium on the Control and Improvements of Food Supplies. These papers will be published in the October number of the *American Journal of Public Health*. A great deal of interest has been attached to this subject for many years. Much confusion has arisen in the minds of the public as well as many health workers in regard to this subject. It is hoped that these papers will serve to turn the tide of public sentiment and to furnish a more logical basis for scientific reasoning.

A very interesting discussion on the subject of occupational diseases was held at one of the general sessions. Papers were presented by such noted speakers as Dr. John B. Andrews, Dr. Alice Hamilton and others.

At another general session the question of venereal diseases was discussed. The most important paper of this session was read by Dr. James H. Landis, the health officer of Cincinnati. By arrangement with the secretary of the American Public Health Association, the Secretary has secured permission to print Dr. Landis's paper in the October issue of the MONTHLY BULLETIN of the State Board of Health and the same is commended for your careful consideration.

In the section meetings various subjects were taken up for consideration, such as disinfectants, water examinations, milk examinations and various papers on communicable diseases.

Many interesting papers were presented in the section on Vital Statistics and the section of Public Health Officials, which had to do with improved methods of public health bookkeeping and public health administration. The various phases of sanitary engineering were considered in the section on Sanitary Engineering. One of the most interesting discussions in this section was the Symposium on the Present Status of Stream Sanitation in Various States. Representatives from the departments of health from quite a number of the different states presented brief resumes on the present status of affairs. A very comprehensive paper dealing with this subject in Ohio was prepared by the chief engineer, Mr. W. H. Dittoe, and was presented by the Secretary.

In the sociological section the Sociological Aspects of Recent Reorganization of Health Departments was considered. Dr. R. H. Bishop, Jr., of the Cleveland department of health, presented a paper dealing with the organization of this department under the new municipal charter.

Other papers of minor interest were also presented during this discussion.

The sociological section also discussed methods of securing funds for public health work and the economic aspects of health.

The Association adjourned to meet in Jacksonville, Florida, in 1914.

Monday evening, October 6th, the Secretary addressed the Men's Clubs of the Congregational churches of Columbus, at the First Congregational Church, on the subject of "The Work of the State Board of Health," the same being a part of the general symposium for the year on "The Business of the State."

INVESTIGATIONS.

Diphtheria.

On September 8th, the epidemiologist investigated an outbreak of diphtheria at the Boys' Industrial School, situated on the outskirts of Lancaster. His report may be found on a subsequent page.

October 1st, upon request of the president of the board of health of Dayton, Dr. P. W. Conklin, the Secretary detailed Mr. Fred Berry, assistant bacteriologist, to go to Dayton to reorganize the municipal health laboratory and to give instructions in laboratory diagnosis. At the time of the inspection a small epidemic of diphtheria was prevailing in Dayton, and the physicians were instructed to send in swabs for bacteriological diagnosis. Mr. Berry assisted in this work.

Food Poisoning.

Upon request of the health officer, the epidemiologist investigated an outbreak of food poisoning at Bellefontaine on August 13, 1913. His report may be found on a subsequent page.

Milk Sickness.

On September 29th, the epidemiologist visited Urbana to investigate cases of suspected milk sickness occurring in the practice of Dr. C. C. Craig. His report may be found on a subsequent page.

Pellagra.

At the request of a physician in Auburn, Ind., August 16th, the epidemiologist investigated a case of suspected pellagra in Mark Township, Defiance County. His report may be found on a subsequent page.

Smallpox.

Dr. Dick, one of the medical inspectors, saw a case of smallpox in Columbus, a man who had been with a gang of workmen on the Hocking Valley near Toledo, and who reported that these men were affected with ivy poisoning. Dr. James G. Cullen, of Toledo, medical inspector, was asked to make an investigation. On August 29th, he found one man with a well marked case of smallpox, who was sent to the pest house. His roommate had an illy-defined rash, which he claimed he had for a month, and complained of no other symptoms. He had never been vaccinated and refused to be, so he was also detained in the pest house for observation. Another roommate who was also working with the same gang was vaccinated. The health officer was seen and advised to fumigate the house and secure the vaccination of all persons in the neighborhood. The foreman of the railroad gang was also seen and advised to have all the men vaccinated.

September 6th, upon request of the health officer, the epidemiologist visited Marion to investigate an outbreak of smallpox. His report may be found on a subsequent page.

September 16th, upon request of the health officer, the epidemiologist visited Delaware to investigate a case of eruptive disease in which the diagnosis was not clear. His report may be found on a subsequent page.

September 17, 1913, in compliance with a request from the health officer, the epidemiologist visited Bellevue to investigate a case of eruptive disease in which the diagnosis was in doubt. His report may be found on a subsequent page.

Typhoid Fever.

August 7th, upon request, the epidemiologist visited Gambier, Knox County, to investigate an outbreak of typhoid fever. His report may be found on a subsequent page.

September 12th, upon request of the health officer, the epidemiologist visited Piqua to investigate an outbreak of typhoid fever. His report may be found on a subsequent page.

DIVISION OF TUBERCULOSIS.

A report of the work of this division may be found on a subsequent page.

DIVISION OF OCCUPATIONAL DISEASES.

A report of the work of this division may be found on a subsequent page.

Since the last report 76 different places have been visited by a representative of the Board, and 315 inspectors made. One hundred and eighty-five inspections were made by a representative of the Division of Occupational Diseases; 64 by the State Inspector of Plumbing; 53 by one of the engineers; 10 by the epidemiologist; 1 by a medical inspector; 1 by the assistant secretary, and 1 by the assistant bacteriologist. In addition to these inspections, 15 visits were made by various members of the Division of Tuberculosis, and one member of the Division is in constant attendance at the Public Health Exhibit.

Proposed or Additional Water Supplies.

The engineering department has investigated the proposed water supply for the Colonial Heights and Midvale additions at Akron, Athens, Frankfort and Wooster; an additional water supply for Clyde, Dayton State Hospital, Hillsboro, Lisbon, Toronto, and the Wildwood addition at Toledo, and proposed water purification at Upper Sandusky. The water purification plant under construction at Willoughby was also inspected.

Reports have been prepared for consideration at this meeting on proposed water supply for Baltic and water purification at Steubenville.

A representative of the Engineering Department visited *Athens*, in compliance with a request from the Mayor, to examine a contemplated site for a new water supply, located directly north of the city, on the east side of the Hocking River at a point where the river approaches the easterly limits of its valley. Visual examination indicated that the site is less desirable than the one at present utilized and the authorities were advised that it would appear that proper development of the site northwest of the existing wells is preferable to the one contemplated.

Examination of water from a test well drilled near the Water Pumping Station at *Bellevue* indicated a water of satisfactory quality from a sanitary standpoint and no evidence of serious organic contamination was shown. The authorities were advised that the mineral content of the water was, however, decidedly objectionable and its excessive hardness would render it unfit for general purposes and it would be costly, if not impracticable, to soften this supply.

The Engineering Department investigated a proposed additional water supply for the city of *Salem*. It was found that a well had been drilled on the site of the present Whinnery Farm wells, approved by the Board in 1903, and analyses of samples indicated a water of good quality from a sanitary standpoint; the only objectionable characteristic being the high iron content which may reduce upon continued pumping. It was observed that no steps have been taken to provide covers for the collecting wells at the pumping station although at various times since 1907 the authorities have been advised to cover the wells to prevent deterioration of the water supply resulting from the growth of micro-organisms. The exposure of the water to sun light causes luxuriant algal growths to develop, which impart objectionable tastes and odors to the water, and the authorities were again urged to provide a substantial roof or cover for the collecting wells.

Existing Water Supplies and Purification Works.

The existing water supply was examined by the engineering department at Alliance, Ashtabula, Bellaire, Bradford, Canal Fulton, Conneaut, Continental, East Palestine, Geneva-on-the-Lake, Hamilton, Leipsic, Mansfield, Plymouth, Rockford, St. Clairsville, Salem, Springfield and Tiffin.

Upon recent examination of the public water supply of *Barnesville* it was found that the patrol of the watershed above the impounding reservoir is receiving attention and that the rules and regulations for the protection of the supply are being strictly enforced. At the time of sampling there was no evidence of dangerous contamination. In spite of the favorable analyses, however, the supply cannot be considered entirely safe until a purification plant has been provided and the authorities were requested to consider the desirability of providing a plant.

Examination of the water supply of *Bradford* revealed that a new well has been installed on the water works property. It was observed that a privy on the northwesterly corner of the water works property is in an insanitary condition, subjecting the supply to danger of pollution. Analytical results of examination of samples collected indicated that the supply receives dangerous pollution and the authorities were advised to take immediate steps to remove or properly reconstruct the privy on the Water Works property.

Examination of the water supply at *Gibsonburg* indicates that the water is of satisfactory sanitary quality, and with proper protection of the wells it is reasonable to suppose that this quality may be maintained.

Examination of samples of the public water supply at *Lakeside* and of semi-public wells, indicate that the filtered supply is of satisfactory sanitary quality and safe for drinking purposes. Examination of private wells indicated that the so-called East Park well receives pollution. The Central Park well and the German Auditorium well were found to be furnishing a satisfactory water at the time of sampling.

Investigation of the water supply at *Leipsic* showed that a marked decrease in the iron content of the water has taken place, although the sulphuretted condition of the water continues. The deferrization plant recently installed is effective in removing the objectionable odor from the water. It was found that an attempt had been made to convert the aerator into a coke aerator by placing coke upon the trays. The authorities were informed that this is not advisable, and that either the conical aerator should be used as installed or suitable coke trays substituted. A new well, 150 feet northwest of the deferrization plant has been installed and is pumped directly into the mains and not discharged through the aerator. The analytical results indicated a water of satisfactory quality and the authorities were advised that its physical characteristics would be improved by passage through the aerator, making it more suitable for domestic use.

Examination was made of the water supply of *Mansfield,* giving particular attention to the storage reservoir near the Main Street Pumping Station. Water in the reservoir was found to be receiving contamination of a dangerous character, due to exposure and the consequent entrance of dust and other wind-borne infection. The quality of the water received from the wells was found to be satisfactory. The Director of Public Service was again urged to improve the reservoir by covering it and thus protect the water supply from deterioration.

The results of an examination of the public water supply of *Monroeville* indicate a supply wholly unfit for domestic use, the water being seriously polluted and containing organisms of intestinal origin. This water supply was approved by the Board in 1897 only upon condition that it be purified and has, therefore, been illegally installed and used. The Board of Trustees of Public Affairs was notified that it is obviously impossible to protect the source of supply from dangerous contamination and the only feasible method of improving the quality of the supply is to install a purification plant; and council should be requested to secure funds for this purpose.

Examination of the water supply of *Newark* revealed the fact that no steps have been taken to increase the capacity of the supply by installing additional infiltration units and that nothing has been done to comply with previous advice given the authorities that an engineer be engaged to investigate the desirability of installing a water purification plant. The raw water from the north fork of the Licking River has been used to supplement the supply from the infiltration wells, though at the time of recent examination the entire supply was being obtained from the wells. The Director of Public Service was notified that the quality of the supply indicated by the analytical results, is satisfactory from a sanitary standpoint, but the inadequacy of the wells and the likelihood of the occasional use of the river water stands as a constant menace to the quality of the supply, and he was again asked to consider the Board's advice in regard to purification of the supply.

Upon recent examination of the public water supply of *Norwalk,* it was found to be of fair quality from a sanitary standpoint. The authorities were advised, however, that inasmuch as the supply is of surface origin it cannot be considered a safe one and must be looked upon with suspicion, and that it is highly important that provision be made for properly purifying the supply, before it is pumped into the mains.

Examination of the reservoirs indicated that there is a possibility of direct contamination of the supply from a spur track of the Wheeling and Lake Erie Railroad which is used occasionally for work trains.

The authorities were advised to take steps to bring about the adandonment of this practice, and to request council to provide funds for a purification plant.

Examination of the water supply of the *Ohio State School for the Blind,* revealed a water of satisfactory sanitary quality. The objectionable characteristics of the supply consist in the excessive hardness and high iron content.

Recent analyses of the public water supply of *Put-in-Bay* indicate that the lake water was slightly turbid, but contained no objectionable organic pollution and that the water is at the present time safe for drinking purposes.

The public water supply of *Rockford* was found to be satisfactory from a sanitary standpoint. The principal objection to the water is its high iron content which imparts an objectionable turbidity. The authorities were advised to remove two privies, one on property south of the pumping station and one on the water works property, or to reconstruct them in a proper manner.

After a complete examination of the water supply at *Vermilion* the authorities were advised that it is impossible to secure a well purified effluent with the present purification plant and an entire new installation will probably be required. They were strongly urged to take steps to secure plans for a new plant.

Upon recent examination the public water supply of *Warren* was found to be unsatisfactory from a sanitary standpoint. The total number of bacteria in the sample examined was high and indicated a rather low bacterial efficiency of the water purification plant. The Board of Health was advised to urge the water works officials to take immediate steps toward improving the various unsatisfactory features of the purification plant, as outlined in a communication sent the Trumbull Public Service Company, July 3rd. At that time it was stated that the company contemplated installing a new purification plant and in view of that fact it was not deemed advisable to make extensive or costly improvements in the existing plant.

Proposed Sewerage and Sewage Treatment.

Investigations were made relative to proposed sewerage for the Colonial Heights addition at Akron, proposed Mill Creek intercepting sewer at Cincinnati, sewerage at Coshocton, New Straitsville, and intercepting sewer at Wapakoneta; and proposed sewage treatment plants for Alliance, Cleveland (The Schell Addition) and Kenmore.

Reports have been prepared for consideration at this meeting on proposed additional sewerage at Coshocton, the proposed Mill Creek intercepting sewer and proposed sewage disposal at the Interstate Stock Yards at Toledo.

Upon investigation, it was learned by the Engineering Department that the village of *Canal Fulton* had failed to install a sewer in Canal and Poplar Streets in accordance with plans conditionally approved by the Board, February 15, 1912, and that an existing storm water sewer discharging into the Tuscarawas River at Poplar Street is being utilized as an outlet sewer. The attention of the Mayor and Council was called to this matter and they were advised that immediate steps should be taken to install the outlet sanitary sewer in Poplar Street. It was also learned that the Board of Education desires an outlet extension to provide for improved sanitary equipment, greatly needed. The Mayor and Council were also advised that this would not be permitted until a satisfactory outlet has been established, and that funds should be provided for the installation of the outlet sewer as designed.

In accordance with the resolution adopted May 22, 1913, the Secretary issued the following approvals:

September 9, 1913, approval of plans for proposed sewerage and sewage treatment plant for the high school building at Convoy, received August 12, 1913, from the American Warming and Ventilating Company of Toledo, subject to the following conditions:

1st. That the plant shall be abandoned and removed whenever a sanitary sewer shall have become available for the removal of the sewage from the school building;

2nd. That a course of graded gravel be placed immediately surrounding the distributing and underdrainage lines;

3rd. That the sludge be removed from the tank at intervals not greater than one month during the school year.

September 11, 1913, approval of plans for sewage treatment plants for the Grant Street School and the Stevens Street School at Newark, received August 27, 1913, from Mr. Vernon Redding, architect, subject to the following conditions:

1st. That direct ventilation of the septic tanks, dosing chamber and filter chambers shall be provided by connection to the main ventilation stacks of the respective school buildings;

2nd. That double automatic alternating siphons be substituted for hand controlled siphons;

3rd. That sand having an effective size of 0.4 to 0.6 m.m. and a uniformity coefficient of not more than 2.0 shall be used as a filtering medium, and that samples of the sand to be used shall be approved by the Engineer of the State Board of Health before being placed;

4th. That the ventilators for the underdrains of the filters shall be of iron pipe and shall extend at least 12 inches above the surface of the sand;

5th. That the board of education of the city of Newark shall employ a competent caretaker to attend to the operation of the proposed plants;

6th. That the proposed sewage treatment plants shall be abandoned and removed as soon as a sanitary sewer shall have become available for the removal of the sewage from the school buildings; and, 7th. That this approval shall be void unless the proposed sewage treatment plants shall have been constructed prior to June 1, 1914.

September 17, 1913, the director of public service of Fostoria was notified that revised plans for proposed improvement of the sewage treatment plant at Fostoria, submitted August 13, 1913, were satisfactory and comply with the fourth condition of the Board's approval of the original plans granted June 26, 1913, and the advice given.

August 21st, plans were submitted by a firm of architects for the disposal of sewage from a new high school building at Castalia. Upon examination by the engineering department it was found that the plans did not provide a satisfactory method of disposal and that it would be impracticable to install cesspools in accordance with the provisions of the Ohio Building Code. The board of education was, therefore, advised to take up the question of proper disposal of the sewage with a competent sanitary engineer in order that proper plans may be secured.

Existing Sewerage and Sewage Treatment.

The existing sewerage at Van Wert was inspected, and the sewage treatment plants at Columbus and Geneva and sewerage conditions at Geneva-on-the-Lake and Leipsic, were investigated.

Upon request of the Mayor, sewerage conditions at *Antwerp* were examined and two small streams, one in the northerly and one in the easterly portion of the village, were found to be in an insanitary condition, due to the discharge of sewage and other wastes into them. The most serious condition exists in the ditch crossing the northerly portion of the village, brought about by the discharge of sewage from a school building.

The Mayor was advised that unless proper sanitary sewers are provided to furnish means of removing sewage and other wastes from these ditches the pollution will increase and that a competent sanitary engineer should be secured to prepare plans for a system of sanitary sewers for the entire village.

A report was made upon the existing disposal of sewage at the Pickaway Township Centralized School, located south of Circleville. The board of education of Pickaway Township, Pickaway County, was notified that it appeared from investigation that the only proper way of disposal of the sewage from this school is by some method of sewage treatment, and the board was advised to take up the question of installing a proper sewage treatment plant at the earliest possible time.

Nuisance.

In compliance with instructions given at the July meeting, one of the Engineers visited the plant of the Hager Strawboard Company at

Cedarville, August 29th, to investigate the disposal of wastes in relation to the pollution of Massicks Creek. He found that the wastes are conveyed in an open flume to settling ponds where the heavier solids are deposited. It was learned that the wastes had occasionally been discharged into the Creek direct, and thus caused the pollution of the stream.

The company was advised to replace the flume by an enclosed conduit constructed of cast iron pipe or vitrified sewer pipe with cemented joints, and to first submit plans to the Engineering Department for criticism.

September 19th, upon request of the health officer of *Columbus*, the epidemiologist made an investigation of the methods used for disposing of manure and refuse at the State Fair Grounds. His report may be found on a subsequent page.

The Engineering Department investigated the pollution of Sucker Run, passing through the westerly portion of the village of *Clyde*. It was found that the run is grossly contaminated by sewage discharged from residences bordering it. It was learned that all of these residences are accessible to the sanitary sewer system, and that the health officer had been unable to enforce connection with the sewers, due to the lack of an ordinance by council regulating such matters. The Mayor and Council were advised to pass an ordinance regulating the proper use of sanitary and storm water sewers and requiring connection to the sewers from residences provided with plumbing.

Complaints having been received of the pollution of the shores of South Bass Island with garbage and other refuse, an investigation was made by the Assistant Secretary. The shore at *Put-in-Bay*, from Peach Tree Point to "Hotel Victory Dump" was inspected, and the dump was found to be in a very filthy condition. There was evidence of garbage and wastes of all kinds, including much that could have been readily burned. The practice is to haul this refuse to the lake shore and dump it into a small cove, a wooden chute being used to convey the refuse into the water. Following the road from the dump to the main road it was observed that a great deal of refuse of all kinds had been dumped at various places. Persons living along the shore at Peach Tree Point complained that during storms coming from the west and southwest, the refuse thrown into the lake is washed down along the shore and lodges in the rocks.

A letter was sent to the health officer stating the conditions found and advising that council be asked to provide some system for taking care of the garbage and other refuse of the village before the opening of another season.

Bense Propositions.

The following orders were submitted to the Governor and Attorney General September 17, 1913:

Requiring the city of Akron to install sewage treatment works prior to June 1, 1915.

Requiring the city of Canton to install necessary sewers and sewage treatment plant prior to January 1, 1915.

Requiring the village of Chardon to install sewerage and sewage treatment plant prior to January 1, 1915.

Requiring the commissioners of Franklin County to install sewage treatment works prior to July 1, 1914.

The orders for Canton, Chardon and the Franklin County Commissioners were approved by the Governor and Attorney General on the 18th, and sent to the authorities September 19, 1913. The order against the city of Akron is still in the hands of the Governor and Attorney General.

Reports have been prepared for consideration at this meeting on an investigation of the pollution of the Maumee River at Toledo by sewage and other wastes from the villages of Maumee and Perrysburg; and the pollution of Chippewa Creek at Rittman by wastes from the plant of the Ohio Boxboard Company.

A petition has been received from the trustees of Jennings Township, Putnam County, asking the Board to investigate the pollution of Jennings Creek by the sewage from Delphos and other communities.

Greenville. September 26, 1913, the mayor and solicitor of Greenville, Darke County, came to the office of the Secretary to confer with reference to further consideration by the city council of installing a sewage treatment plant without referring the question to a board of referee engineers. It was deemed necessary by the representatives of the city that the order of the court of appeals of Darke County, dissolving a temporary injunction made and entered on May 31, 1913, be suspended for a further period of fifty days from September 29, 1913. As a result of the conference an agreement for such suspension was signed by a representative of the Attorney-General's Department for the defendant and by Edward C. Wright, city solicitor, for the plaintiff.

State Plumbing Inspection.

During the month of August the State Inspector of Plumbing made twenty-seven inspections in the following places: Bellaire, Beach City, Delphos, Mansfield, Martins Ferry, Oak Harbor, Pemberville, Urbana and Wadsworth; and 37 during September in Bettsville, Big Prairie (Clinton County), Bucyrus, Circleville, Chillicothe, Convoy, Findlay, Hamilton, Lima, London, Mansfield, Marion, Middletown, Pemberville, Pickaway Township, Pickaway County, Upper Sandusky and Van Wert.

During August owners of certain buildings in Bellaire, Lima, Martins Ferry, Oak Harbor, Port Clinton, Pemberville, Sidney, Wapakoneta and Yorkville were notified that the plumbling must be installed in accordance with the Code.

During September such a notice was sent to owners of certain buildings, in Bridgeport, Columbus, Franklin, Findlay, Lima, Mansfield, Martins Ferry, Middletown, Piqua and Upper Sandusky.

In August plans were examined and verbal recommendations made for plumbing in the Centralized School at Sabina; and in September for plumbing in a bank, office building and mercantile building in Mansfield, a lodge building in Tiffin and an office building in Shelby.

Certificates of approval were issued during August for three school buildings in Newark, and a store and flat building in Martins Ferry; and during September for school buildings in Circleville, Chillicothe and Tiffin, cigar factory at Findlay, a church, public comfort station and telegraph station at Marion, passenger station at Martins Ferry, and store and residence in Circleville and Martins Ferry.

The Secretary has reviewed the reports and receipts of the State Inspector of Plumbing and finds that fees to the amount of $130.00 were collected during August and $105.00 during September.

DECEMBER MEETING.

On November 7th, the Secretary attended a conference called by the president and trustees of the Ohio State University, at the request of the Governor, for the purpose of discussing ways and means by which the university could co-operate with the various state departments. The Governor was especially interested in co-operative arrangements which might possibly be made between the university, the Ohio Board of Administration and the State Board of Health.

A committee was appointed, consisting of Mr. Starr Cadwallader of the Ohio Board of Administration, Chairman, President Thompson of the Ohio State University and your Secretary. The committee has up to the present time held three meetings, at which the needs of the Board of Administration and State Board of Health were presented. A meeting was held November 24th, at which time the university authorities made statements as to facilities for supplying the needs expressed. A more detailed discussion of the proposition of the co-operation between the State Board of Health and the Ohio State University, along the lines suggested by the Governor, will be submitted by your Secretary as a separate report.

The report of the committee with recommendations will be submitted to the Governor on the completion of the survey.

On November 10th, the Secretary addressed the Conference of State Charities and Correction at Akron on the subject of Health Conservation.

It has been generally recognized for a long period of time that the State Sanatorium for Tuberculosis at Mt. Vernon was operating under considerable difficulties due to popular prejudice among medical men and laity of the State as well as on account of certain statutory provisions. The Secretary directed the chief of the Division of Tuberculosis to make a careful survey of the institution and methods under which it is operated, in the hope that the State Board of Health might be of service in placing the institution upon what might be regarded as a legitimate and fair basis and also connect the work of the Sanatorium with the present organized campaign for the prevention of this disease, which the State Board of Health is now carrying on through its Division of Tuberculosis.

The Secretary visited the sanatorium, inspected the institution, and held a conference with the superintendent. The superintendent also conferred with the Secretary and the chief of the Division of Tuberculosis on two occasions in Columbus. A definite statement was prepared for submission to the Ohio Board of Administration and presented to that Board November 14th.

It was recommended that the law governing the sanatorium be so changed as to eliminate the $5.00 a week now charged each patient and that the State Board of Health be given supervision over the admission and discharge of patients of this institution. Certain other details were presented which make possible the co-operation of the Ohio State Board of Administration and the State Board of Health.

The Board of Administration received the report of your Secretary with favor and after a conference with the Board of State Charities as to methods of collecting a uniform fee from the patients who are able to pay, definite recommendations will be made to the governor along the lines suggested by the Secretary.

November 5th, The State Agricultural Commission called a conference for the purpose of considering the proposition of the abatement of stream pollution. The commission undoubtedly was not aware of the fact that the State Board of Health was doing work along these lines.

The Secretary and chief engineer represented the Board at this conference and presented to the commission a comprehensive discussion of the work which the State Board of Health has already accomplished and the work now under way. As a result of the conference a committee consisting of your Secretary, as chairman, General Speaks, Chief Game Warden, and Dr. Paul Fisher, State Veterinarian, representing the State Agricultural Commission, was appointed for the purpose of considering ways and means by which the laws could be broadened to make possible the prevention of any stream pollution.

This committee held a conference on November 12th at which time it was deemed advisable not to submit any amendments to the existing laws under which the State Board of Health operated but to submit to the Governor a joint bill dealing with the prevention of direct or indirect pollution of streams by manufacturing wastes, unless permit for same is first secured from the State Board of Health, and also making it illegal for any one to deposit any noxious material in the streams or along the banks not otherwise provided against by existing statutes.

November 13th, the Secretary and Assistant Secretary held a conference with the Budget Commissioner, Mr. Heffernan. The Governor wishes the legislature to repeal the 1914 appropriation bill and substitute in its place a segregated budget bill, to be provided by the Budget Commissioner. The budget blanks have been submitted to this department and will be submitted to the Budget Commissioner on December 15th.

The system involves a complete reclassification of the expenditures of the State Board of Health and other departments. Definite recommendations will be made to the Board at its meeting on December 3rd, relative to certain additional requirements and the new budget system will be explained at that time.

Since the last report of the Secretary, several conferences have been held with representatives of the various state departments dealing with propositions of a statewide survey of streams of the State, for the purpose of considering adequate flood protection plans, stream flow measurements, stream pollution, etc.

It is also aimed to give some consideration to the proposition of navigation in order to interest the Federal government and secure its co-operation in the appointment of certain army engineers to co-operate with engineers representing the state in making this survey. As yet the general plan has taken no definite shape but the proposition will be submitted to the Governor for his consideration in due course of time.

INVESTIGATIONS.

Diphtheria.

October 1st, upon request of the board of health, and under direction of the Secretary, the assistant bacteriologist went to Dayton to organize laboratory work and give assistance in the control of a threatened diphtheria epidemic.

In 1912 an epidemic occurred, 144 cases being reported in September, and the routine methods of control were inadequate. Soon after school opened a marked increase in cases resulted in a system of volunteer school inspection. The lack of organization and of proper laboratory facilities was no doubt responsible for the failure of this inspection. The situation became acute and the schools were closed for three weeks. The loss of approximately $35,000 in school expenses, added to the personal losses and the effect upon the community, may suggest the gravity of the situation.

Anticipating the recurrence of an epidemic the board of health in 1913, required all quarantines for diphtheria to be controlled by laboratory cultures. As a result, in September 85 cases were reported. Many ordinarily diagnosed as sore throat, tonsilitis, etc., proved by bacteriological examination to be diphtheria, and physicians began to use the laboratory for confirming their diagnoses as well as for controlling quarantine. The third week it became evident that the disease had invaded the schools and as no adequate school inspection existed the board of health asked physicians of the city to act as inspectors. October 1st, between fifteen and twenty physicians responded, each assuming charge of a district where he inspected children in the schools and visited the absentees. Every suspicious throat was swabbed and the child sent home until the result of the laboratory examination was known. Parents were instructed to isolate such a child and to call the family physician for continued observation. The first day of inspection over 100 children were sent home on account of abnormal throat conditions. Of this number 24 were shown to harbor diphtheria bacilli. The second day 14 positive cases. were found, and the gradual decrease in the course of a few days was due, no doubt, to the first day's careful inspection. Laboratory reports still show a number of positive findings, from apparently normal throats among school children. During the month of October 270 cases and 2 deaths were reported. Instructions were given for the control of suspects and carriers. Council appropriated $5,000 and the board employed additional assistance.

The laboratory of the board of health was found poorly located and meagerly equipped, and the amount of work done was very small compared with that of other cities. In the Dayton laboratory since the first of the year 687 examinations had been made, at an average cost of approximately $1.20, while in the Columbus laboratory during the same period there had been 6,583, at an approximate cost of 22 cents. The laboratory was equipped for the routine work but was not adequate for the large increase.

The Dayton board of health was furnished a report of conditions found and suggestions for their improvement and the adoption of standard laboratory methods was recommended.

October 26th, upon request of the president of the Dayton board of health, and under direction of the Secretary, the epidemiologist visited Dayton to investigate measures in force for the control of diphtheria.

His report may be found upon a subsequent page.

Upon request of the board of administration and under the direction of the Secretary, the epidemiologist visited the Boys' Industrial School at Lancaster September 8th, October 8th and November 18th, for the purpose of suggesting means of restricting the prevalence of diphtheria. His report may be found upon a subsequent page.

Upon request of the health officer, November 17th, the Secretary directed Dr. L. F. Laudick, medical inspector, to go to La Rue to investigate an epidemic of sore throat. Dr. Laudick saw several cases and took specimens which upon bacteriological examination showed the presence of diphtheria bacilli. Little attention had been paid to cases until a death occurred from membranous croup (so diagnosed by the attending physician). Three deaths occurred and the people became alarmed. Our inspector advised the use of antitoxin and gave the authorities full instructions which if strictly carried out will suppress the disease.

Since the last report, Dr. Geo. Chapman made an investigation of an outbreak of diphtheria at Tiffin. There were several cases of throat trouble on the route of a certain milkman which had been diagnosed as tonsilitis by some and diphtheria by other physicians. Dr. Chapman saw several cases which from a clinical standpoint were malignant diphtheria. Bacteriological examination gave evidence of mixed infection. Antitoxin had been used in proper dosage and the cases cleared up rapidly. In order to locate the source of infection the peddling of the milk by this man was stopped and cultures made from the throats of each one handling the milk. These proved negative. Samples of milk were then taken from each source of supply and cultures made. In one of these was found a bacillus resembling in its manner of growth and staining properties the Klebs-Loeffler bacillus. In another sample was found the "hay bacillus" and other evidences of dirt. A trip was made to the out-lying farms which were the sources of supply for this milkman and after removing the causes of the trouble (dirty cans and handling) the route was again resumed. Since then there has been no further trouble.

On November 20th, in compliance with the request of the school commissioner and local board of health, the epidemiologist was sent to investigate the diphtheria situation in Harrison Township, Montgomery County. His report may be found upon a subsequent page.

On December 2d, in compliance with the request of the Board of Education, the Secretary sent the epidemiologist to Huron to investigate an outbreak of diphtheria. His report may be found on a subsequent page.

Enteritis.

Under the direction of the Secretary, on November 21st, the epidemiologist consulted with the health officer of Van Wert, in regard to a large number of cases of an obscure form of enteritis. His report may be found on a subsequent page.

Scarlet Fever.

November 20, 1913, Dr. D. O. Weeks, under the direction of the Secretary, visited Grand Prairie Township, Marion County, six miles from Marion, to investigate the failure to quarantine a case of scarlet fever. Dr. Weeks found that the attending physician had reported the case to one of the trustees of the township but the trustee failed to notify the health officer. He, however, secured a scarlet fever card in

Marion, and placarded the house. The trustees and health officer are farmers and were not familiar with their duties in regard to protecting the health of the community. Dr. Weeks gave full instructions to the health authorities and the family in which the case of scarlet fever occurred and impressed upon them that the health laws must be carried out.

Smallpox.

Smallpox is present in the State School for the Deaf and in the Institution for Feeble Minded Youth. A report of the investigations of these outbreaks may be found on a subsequent page.

Early in October a case of smallpox occurred in Delphos, the patient being a young man, nineteen years of age, whose parents lived in Jennings Township, adjoining the city. The parents were well-to-do country people and had their son removed to his home. On the 8th of October the health officer asked that a medical inspector be sent to Delphos, but as there was no question as to the diagnosis he was notified that an inspector could come only at local expense. The local authorities agreed to bear the expense and the Secretary instructed Dr. L. F. Laudick, medical inspector, to go on October 10th. He visited twelve houses and found the usual mild form of smallpox, one very typical case and all with the usual symptoms. At Fort Jennings, six miles from Delphos, four cases were found. Full instructions were given to the health authorities for dealing with smallpox. The health officer was having trouble getting prompt reports from some physicians and he was advised to prosecute the first physician found who had a case of smallpox and failed or refused to report it. During October, twenty-six cases were reported in Delphos and twelve in Jennings Township. For the first two weeks of November thirty-two cases were reported in Delphos.

October 18th, in compliance with a request from the health officer, the Secretary sent the epidemiologist to Pomeroy and Syracuse, Meigs County, to investigate an outbreak of eruptive disease. His report may be found upon a subsequent page.

November 12, 1913, upon request of the health officer, Dr. James G. Cullen, medical inspector, was sent to West Unity to investigate a case of suspected smallpox. The patient, a young woman of twenty-two years of age, had been sick a week. The attending physician had thought the disease pneumonia until a rash developed. When seen by Dr. Cullen there seemed to be no doubt about the case being one of smallpox. Instructions were given the health officer in regard to quarantine and vaccination of exposed persons. The origin of this case could not be determined.

On October 2, 1913, in compliance with the request of a physician, the epidemiologist was sent to Richwood to examine some patients suspected of having smallpox. His report may be found upon a subsequent page.

December 5, 1913, at the request of the township health officer, the Secretary directed Dr. L. F. Laudick, medical inspector, to go to Arlington, Hancock County, to investigate smallpox. He found the usual mild form of the disease, which had not been determined until after general exposure. Two children in school had undoubtedly passed through the usual stages of smallpox but no effort had been made to prevent its spread. Necessary instructions were given in regard to stamping out the disease.

On December 27, 1913, in compliance with a request, the epidemiologists visited Centerburg, to investigate a case of eruptive disease. He found two cases of smallpox. They were of a mild variety and very few exposures had taken place. The authorities were given the proper instruction. His report may be found on a subsequent page.

On December 29th, in compliance with the request of a physician, the epidemiologist visited Franklin Township, Franklin County, to investigate a case of eruptive disease. His report may be found upon a subsequent page.

In compliance with the request of a physician, the epidemiologist visited King's Mill in Deerfield Township, Warren County, on November 25th, to investigate an outbreak of smallpox. His report may be found upon a subsequent page.

On December 1st, upon request, the epidemiologist was sent to investigate an outbreak of an eruptive disease at the Marble Cliff School which is attended by about 150 pupils. His report may be found upon a subsequent page.

November 28, 1913, Dr. L. F. Laudick was asked to go to Marion Township, Allen County, to investigate smallpox. He found the usual mild form of smallpox and a question as to the diagnosis. Two houses were infected. The medical inspector confirmed the diagnosis of smallpox and gave instructions for quarantine.

Pemphigus Syphiliticus.

On December 13th, in compliance with the request of the health officer, the Secretary directed the epidemiologist to investigate an eruptive disease at Marion. His report many be found upon a subsequent page.

Trachoma.

On November 12th, 13th and 14th, in compliance with the request of the Youngstown Sheet and Tube Company, the epidemiologist and Dr. Hayhurst investigated an outbreak of trachoma at East Youngstown. The report of this investigation may be found upon a subsequent page.

On December 5th, acting under the direction of the Secretary, the epidemiologist again visited East Youngstown to determine whether the campaign against the spread of trachoma was proceeding satisfactorily. His report may be found upon a subsequent page.

Typhoid Fever.

On October 24th, the epidemiologist visited Wagram, Etna Township, Licking County, to investigate an outbreak of typhoid fever. His report may be found upon a subsequent page.

November 15th, in compliance with the request of a clergyman, the epidemiologist was sent to Adena, Jefferson County, to investigate an outbreak of typhoid fever. His report may be found upon a subsequent page.

DIVISION OF TUBERCULOSIS.

A report of the work of this division may be found upon a subsequent page.

DIVISION OF OCCUPATIONAL DISEASES.

A report of the work of this division may be found upon a subsequent page.

Proposed or Additional Water Supplies.

A representative of the Engineering Department visited the following places relative to a proposed or additional water supply: Akron, Barberton, Bellevue, New London (three inspections), Westerville and Wooster.

A report has been prepared for consideration at this meeting on detailed plans for development of a proposed water supply for Akron, water supply for Colonial Heights (Akron), additional water supply for Alliance, Barberton and proposed supply for Baltic, Kenmore, Lima State Hospital and Swanton.

Upon request of the director of public service, a representative of the Engineering Department visited Bellevue in reference to the contemplated improvement of the public water supply. The investigation indicated that an extension of the water supply is needed to increase the capacity. Council was advised that the possibility of a water purification plant being required should not be overlooked and any steps to increase the supply should take into consideration the provision of a purification plant. It was recommended that a competent consulting engineer, experienced in water works design, be employed to prepare preliminary plans and estimate of cost for such improvements.

The board of trustees of public affairs of Oxford desired to utilize an existing dug well at the pumping station, which had not been in use for several years, to furnish a portion of the public water supply. Samples from this well were examined in the laboratory and the results indicated a water of good quality from a sanitary standpoint and safe for drinking purposes. The authorities were so notified.

The Wiltsie Realty Company at Toledo has installed a water supply for its Wildwood Addition. Upon examination it was found that the site of the well is not entirely satisfactory owing to the likelihood that a sewage treatment plant for Main Sewer District 3, Lucas County, will be installed a short distance south of the well. The quality of the water is satisfactory from a sanitary standpoint. The water is, however, extremely objectionable on account of its mineral characteristics. A large amount of sulphur compounds is in solution in the water as it comes from the well and sulphur is soon precipitated which imparts a turbidity to the water. A distinct sulphur odor is caused and the water is excessively hard. The company was advised that this supply is unfit for general use and would no doubt cause serious complaint on the part of the consumer. It would be possible to improve the quality so far as the sulphur content is concerned, by thorough aeration, sedimentation and possibly filtration. This would involve the installation of a treatment plant and provision for its proper maintenance. In view of these objectionable features and the expense involved in correcting them, the company was advised to obtain a water supply from the city of Toledo.

Existing Water Supplies.

The existing water supply was inspected at Barberton, Beach City, Coshocton, Findlay, Malvern, Marysville, Minerva, Mineral City, Navarre, New Comerstown, Salineville, Toledo and Zanesville.

Upon request of the board of health, the public water supply of Ashtabula was examined to learn the quality of the raw lake water and the purified water delivered to the consumers. The results of examination and the analyses of the samples indicated that the plant is being properly operated and is producing an effluent of satisfactory quality for drinking purposes.

An examination of the public water supply of Coshocton was made by the Engineering Department. It was found that the installation of an additional water supply from tubular wells, approved in 1910, is progressing satisfactorily. The quality of the supply was found to be satisfactory from a sanitary standpoint and the analytical results were similar to those obtained from former samples.

A representative of the Engineering Department inspected the public water supply of Hamilton. Samples were collected at various points on the distribution system. Analytical results indicated that the supply obtained from the wells is of good sanitary quality. Samples taken from that portion of the distribution system east of the Miami River were also satisfactory. Two samples taken on the westerly side of the river from the Wilson Hill reservoir and from the west side fire department station showed the presence of polluting influences. It was thought possible that the reservoir and distribution system on the west side may have been seriously contaminated during the flood last March.

The director of public service was advised that the Wilson Hill reservoir should be emptied and cleaned, and the entire distribution system on the west side thoroughly flushed, and that another inspection of the supply to determine its quality would be made after this was done. The health officer replied, however, that it would not be safe at the present time to empty the reservoir.

Recent examination of the public water supply at Hillsboro revealed the fact that the supply is practically as it existed in 1909. It was observed, however, that seven of the old drilled wells had been abandoned and new wells drilled within a few feet of the old casings. The top of the casings of the old wells have been unprotected, thereby furnishing means for the pollution of the water supply. The board of trustees of public affairs was advised that these casings should be tightly capped, and that the vent pipes leading from the new casings do not extend to a sufficient height to prevent the entrance of flood waters and should be extended.

Water obtained from the wells was found to be satisfactory from a sanitary standpoint and safe for drinking purposes. Its iron content, however, is sufficient to cause a turbidity in the supply. The absence of turbidity and the low iron content of a sample taken from the distribution system indicated deposition of the iron in the mains and standpipe.

Upon request of the board of trustees of public affairs a representative of the Engineering Department visited Lisbon and examined the public water supply. Analyses of samples of the water indicate a good quality from a sanitary standpoint. The bacterial content in all samples was low and no intestinal organisms were found. The chemical characteristics of the water were also satisfactory with the exception of the hardness and iron content.

It was found, however, that the water works property is being used as a dump ground and that a sewer discharges objectionable wastes into a pool which is not more than 25 feet from the nearest supply well. A deterioration of the quality of the supply should be anticipated and while the conditions surrounding the public supply wells might be improved the board of trustees of public affairs was urged to ask council for funds to install an entirely new water supply at a more satisfactory location.

A representative of the Engineering Department visited Malvern to inspect the public water supply and collect samples for examination. The results indicated that the water supply is of good quality from a sanitary standpoint. The principal objection to the supply is its high iron content. Considerable complaint has resulted from the excessive turbidity of the water caused by the precipitation of the iron and it appeared from the results of the recent investigation that an iron removal plant is necessary to provide a satisfactory water supply. The board of trustees of public affairs was advised to recommend the installation of a suitable iron removal plant to the council in order that funds might be provided.

October 10th, a representative of the Engineering Department examined the public water supply of Marysville with special reference to determining the location of connections whereby raw water from Mill Creek might be pumped into the distribution system, letters from citizens having been received informing us of the existence of such connections.

The examination revealed the fact that an intake in Mill Creek is used for obtaining water for boiler purposes. The water is pumped by two pumps into a line leading to a water tank owned by the Toledo & Ohio Central Railway Company. Valved connections from the discharge lines of each pump make it possible to introduce the raw creek water into the main discharge line leading to the distribution system of the village. The valves on these connections are the only means of protecting the quality of the water delivered to the consumers.

Examination of samples of the water collected at various points on the distribution system showed the water supply to be of good sanitary quality, but there is no proof that the supply does not occasionally receive pollution through the connections above mentioned and the possibility of the creek water being introduced at any time into the distribution system through careless operation or accidentally, stands as a constant menace to the quality of the supply. The Marysville Water & Light Company was, therefore, advised to immediately remove these connections and to prohibit any such connections in the future.

The public water supply of Minerva was inspected by one of the engineers and samples collected for examination. The analytical results indicated that the supply as it is obtained from the wells is of excellent sanitary quality and of satisfactory physical characteristics. The iron content was found to be somewhat higher than is desirable in a public water supply. A sample collected from a dead end on the distribution system was turbid and contained considerably more iron than was found in the water taken directly from the wells. The board of trustees of public affairs was advised to frequently flush the dead ends to avoid an accumulation of iron deposits.

A representative of the Engineering Department inspected the public water supply of Navarre and collected samples for examination. Analyses of these indicated a supply of good quality from a sanitary standpoint and safe for drinking purposes. The water is, however, extremely hard.

The results of recent examination of the public water supply of Salineville indicated that the supply has received some contamination, as shown by the presence of colon bacilli in one of the samples. The attention of the authorities was again called to the necessity of improving the public water supply equipment to protect the supply from pollution. It was recommended that tight concrete covers be placed on the pump well and on the supply well located about one-half mile upstream from the pumping station.

A representative of the Engineering Department examined the public water supply of Tiffin. At the time the supply was being pumped from wells Nos. 1 and 6 and the emergency intake into the Sandusky River was closed. Analysis of samples from these wells indicated a water of a high degree of purity from a sanitary standpoint. A sample taken from a tap on the distribution system, however, showed the presence of intestinal organisms in one and ten cubic centimeter portions. It was claimed by the superintendent that no river water had been pumped since March, when it was used for three hours and the presence of pollution was, therefore, difficult to account for.

It was found that an attempt had been made to improve the quality of the river water by installing a plant for hypochlorite treatment. The plant provided is inadequate and will likely not produce satisfactory results in operation. The Water Works Company was, therefore, advised that if it became necessary to use the Sandusky River water at any time a more efficient method of purification must be provided.

It was also learned that the company contemplates the installation of an additional water supply to be obtained from wells about a mile up stream from the pumping station.

Existing Water Purification Plants.

At the time of recent examination of the water purification plant at Alliance the plant was being operated but the water was being filtered without coagulation. Although the filtered water was of good physical quality, practically no bacterial efficiency was secured in passing through the plant due to the absence of chemical treatment.

It was found that the construction work of the plant has been generally satisfactory and in accordance with the plans approved. It is recognized that the capacity of the plant is not sufficient for future needs of the city. The authorities were urged to secure a competent chemist to take permanent charge of the plant, and the hope expressed that provision will be made as soon as possible for an enlargement of the plant.

The city has made application for permission to use an existing well supply as an emergency supply and this will be reported upon for action at the next meeting.

September 27th, a representative of the Engineering Department examined the recently completed water purification plant of the Provident Coal Company at Provident, near St. Clairsville. It was found that the plant has been installed in accordance with plans conditionally approved by the Board, the only criticism in the operation of the plant being the method of applying the coagulant to the raw water. The device installed was objected to by the Engineering Department at the time the plant was proposed but it was claimed by the contractors that the device had given good satisfaction elsewhere and would operate efficiently, agreeing, however, to replace the device with solution tanks and an orifice feed should it be found advisable.

At the time of the recent examination it was learned that considerable difficulty had been experienced in controlling the coagulant feed, due to the incrustation resulting from the use of a concentrated solution of alum. The Provident Coal Company was notified that the present device should be removed and satisfactory solution tanks and an orifice feed substituted.

A letter was also sent to the Wm. B. Scaife and Sons Company of Pittsburg, concerning the replacement of the coagulant feed. They replied asking that one of the engineers meet a representative of their company at Provident in the near future that they may go over the plant together.

In September a representative of the Engineering Department made a general examination of the water purification plant at Upper Sandusky. The plant was found to be in a run down condition and examination of samples of the water indicated that the filtered water was not efficiently purified. The presence of colon bacillus in the effluent showed that the water supply is unsafe without boiling. The attention of the superintendent of the water works company was called to advice given him in April, 1912, that necessary improvements be made in the plant providing for better operating conditions to secure a satisfactorily purified effluent. Recent examination indicated that nothing had been done to improve the plant in accordance with the advice given and that in its present condition the plant could not be expected to produce a highly purified effluent safe for general use.

A site contemplated for the location of drilled wells to be used as a new water supply permitting the abandonment of the present supply and purification plant was also examined. This site appeared to be satisfactory and analysis of a sample of water taken from a well at the

Ohio Brick Company's plant indicated that the ground water in this locality is of good sanitary quality, though somewhat hard and contains some iron in solution. The superintendent of water works was advised that in view of the present unsatisfactory condition of the water purification plant it is imperatively necessary that a new plant be provided, or that the Sandusky River be abandoned as a source and a satisfactory ground water supply be developed.

The superintendent reported that steps are being taken to improve the purification plant and he was advised that with proper equipment, there is no reason why he should not be able to produce a satisfactory effluent by treatment of the water from the Sandusky River, and that it would, therefore, be wise to postpone development of a well supply until consideration has been given to an extensive improvement of the existing plant.

Ohio River Investigation.

Two representatives of the Engineering Department visited the following places in connection with the Ohio River Investigation: Ashland, Ky., Belleville, Catlettsburg, Ky., Cincinnati, Covington, Ky., Gallipolis, Huntington, W. Va., Manchester, Marietta, Maysville, Ky., New Martinsville, New Matamoras, Newport, Ky., New Richmond, Parkersburg, W. Va., Point Pleasant, W. Va., Pomeroy and Middleport, Portsmouth and Ripley.

It will be remembered that in October, 1912, a similar investigation of water supply and sewerage conditions in communities on the Ohio River between East Liverpool and Moundsville, W. Va., was carried on. The recent investigation will complete the examinations of water supplies and sewerage conditions along the river from Pennsylvania to Indiana. These investigations have been made for the purpose of determining the present condition of the water supplies in this district and also for the purpose of noting the pollution of the Ohio River. A complete report is in progress.

Proposed Sewerage and Sewage Treatment Works.

Cincinnati, Fremont and Lucas County, Districts No. 1 and No. 2, were visited by a representative of the engineering department, relative to sewerage and proposed sewage treatment works for a private residence near Dayton, and for Sandusky were investigated.

Reports have been prepared for consideration at this meeting on a relief sewer at Fremont; sewerage for District No. 2, Lucas County; for Beverly Place; District No. 3, Lucas County, and additional sewerage for Westerville.

A report has also been prepared on detail plans for sewage treatment at Canton.

November 1, 1913, revised plans for sewage treatment for the Interstate Stock Yards at Toledo were received. November 15th, the company was notified that these plans are satisfactory and provide proper facilities for removal of sludge, and comply with the first condition of the Board's approval of July 23, 1913.

In accordance with the resolution adopted May 15, 1913, the Secretary issued the following approval:

October 9, 1913, approval of the plans for a proposed sewage treatment plant for the Boardman Centralized School, received from the W. J. Scholl Company of Youngstown, September 9, 1913, subject to the following condtions:

1st. That direct ventilation through the septic tank, dosing chamber, and filters and main ventilation stack of the building shall be provided;

2nd. That the plans shall be revised to provide a filter area of at least 2,000 square feet and that this area shall be installed in the construction of the proposed plant;

3rd. That the septic tank shall be cleaned at intervals not greater than two months during the school year and the material properly disposed of by burial; and,

4th. That this approval shall be void unless the proposed sewage treatment plant shall have been installed in accordance with the foregoing conditions of approval prior to June 1, 1914.

The W. J. Scholl Company was advised to revise the design of the septic tank by providing a floor sloped to a central sump from which the sludge may be pumped; and to provide a manhole in the sewer line leading from the school building.

The plans for a proposed sewage treatment plant for the residence of A. I. Bates at Irvington, near Dayton, received from Gustave A. Niehus, architect, October 8, 1913, were disapproved by the Secretary. Mr. Bates was advised that it would be unsafe to utilize any system of sewage disposal upon his property on account of the likelihood of the water supply obtained from the well 32′ deep being polluted; and that either a watertight cesspool with no outlet or a privy constructed in accordance with the Ohio Building Code should be used.

Existing Sewerage and Sewage Treatment Works.

The existing sewerage was inspected by a representative of the Engineering Department at Beach City, Hilliards, Malvern, Minerva, Mineral City, Navarre, Newcomerstown, Salineville and Wooster; and sewerage under construction at Urbana.

Upon recent examination the sewage treatment plant at Alliance was found to be in good condition and producing a satisfactory effluent. Considerable difficulty has been experienced in the discharge of sludge from the tanks to the sludge beds. The Director of Public Service was advised that the trouble could be easily remedied by the use of an independent sludge drain, having no connection with the central control chamber of the contact bed and he was also advised how this might be economically accomplished.

Sewerage Conditions.

Recent investigation of sewerage conditions at Geneva-on-the-Lake revealed that no improvements have been made since last year. The necessity for proper sanitary sewers with a sewage treatment plant is evident. The installation of cesspools may improve conditions but the nature of the soil is such as to make the operation of cesspools doubtful. The health officer of Geneva Township, in which this settlement is located, was again advised to urge the property owners to co-operate with a view to securing proper sewers.

Upon investigation the sewage treatment plant at Geneva was found to be in a very poor condition and sewage was ponded to a depth of six inches on all but one of the filters. A reconstruction or enlargement of the plant is urgently required, and attention of the mayor and council was again called to the Board's action November 21, 1912, requiring the village to reconstruct and enlarge the plant before November 21, 1913, and urging that the village retain the services of a competent consulting sanitary engineer.

The sewerage conditions at Mineral City were examined by a representative of the Engineering Department and it was found that about one mile of sewers has been constructed, some 4000 feet of which were installed in 1907, following a disapproval of the plans by the Board in 1906. The sewers were installed for the removal of storm water, but are also used for sanitary purposes and sewage is discharged without treatment into Huff Run. Eventually a sewage treatment plant will be required to prevent excessive pollution of the stream and unless sanitary sewers are provided the construction of the sewage treatment plant will be rendered much more expensive. Council was advised to secure plans for a system of sanitary sewers and to enact an ordinance preventing the use of the existing sewers for sanitary purposes. The present sewers could then be used as storm water sewers and with proper disposal of the flow from the sanitary sewers no nuisance in Huff Run would result.

A representative of the Engineering Department examined sewerage conditions at Newcomerstown. It was found that the storm sewers are being misused to receive sanitary wastes, and that objectionable conditions are caused in Buckhorn Creek, which receives the discharge of wastes. Nothing has been done to carry out the plans for a system of sanitary sewers with sewage treatment works approved in 1903. Without a system of sanitary sewers increased misuse of the storm sewers will result in the greater pollution of the creek, and attention of the mayor was called to the desirability of council taking up the question of approving sanitary sewers for the village and submitting the question to the electors to secure funds for the purpose.

Sewage Pollution.

In answer to a complaint received, a representative of the Engineering Department investigated the pollution of Stillwater Creek and Little Stillwater Creek by the sewage of Dennison and Uhrichsville. The investigation revealed the fact that Little Stillwater Creek is grossly polluted by the sewage from the two villages, and that Stillwater Creek is also contaminated by the sewage from Uhrichsville.

The attention of the authorities of Dennison and Uhrichsville was called to the matter and they were reminded of the advice given last year, relative to the necessity of providing improvement in the disposal of sewage, and they were again urged to co-operate in securing plans for the collection and disposal of the sewage of both villages, and advised to retain the services of a consulting engineer to prepare plans for collecting the sewage flow from both villages to one point for treatment.

Mill Creek.

The resolution adopted by the Board at the last meeting, relative to flushing Mill Creek, was referred to the Governor and transmitted by him to the Superintendent of Public Works. November 3rd, a letter was received from the Superintendent of Public Works, Mr. John I. Miller, stating that his department is always ready to assist in the alleviation of conditions in Mill Creek; that for the past two and one-half years the stream has been flushed once a week during the summer months excepting the past summer, when a lack of water due to repairs being made at the Middletown dam prohibited such flushing. The practice of flushing Mill Creek will, however, be resumed.

Nuisance.

Complaint was made by a number of residents in the northern portion of the city of Marietta of insanitary conditions brought about by inadequate drainage. A representative of the Engineering Department visited Marietta but found that the conditions complained of had been remedied by the construction of ditches to drain a low lying territory. The authorities were advised to maintain these ditches in suitable condition to avoid future complaint.

Bense Propositions.

October 28, 1913, the Governor and Attorney General approved the order requiring the city of Lakewood to provide sewage treatment works, satisfactory to the State Board of Health, before June 1, 1915, and the order was sent to the city authorities. November 6th, the city clerk acknowledged the receipt of the order and stated that a consulting engineer had been engaged to prepare plans.

The supplemental order extending the time to September 1, 1914, for the completion of the sewage treatment plant for the city of Fostoria was also approved by the Governor and Attorney General October 28, 1913, and sent to the city authorities.

Reports have been prepared for consideration at this meeting on stream pollution at Vermilion and the pollution of Jennings Creek and Auglaize River at Delphos.

The authorities of Lebanon, Maumee, Perrysburg, and the Ohio Boxboard Company at Rittman, acknowledged receipt of the Board's citation to appear at the December meeting, stating that they would have representatives present.

State Plumbing Inspection.

During the month of October the State Inspector of Plumbing made 37 inspections, in the following places: Archbold, Bowling Green, Bucyrus, Cincinnati, Elyria, Hamilton, Lees Creek, Lima, Marion, Martinsville, Middletown, Morrow, New Vienna, Norwalk, Newark, Paulding, Piqua, Sidney, Springfield, Urbana, Van Wert, Wapakoneta and Wauseon.

Notices were sent to owners of certain buildings in Paulding, Sidney and Wauseon that the plumbing in their buildings must be installed in accordance with the Code.

Certificates of approval were issued for the plumbing in school buildings at Archbold, Bucyrus and Martinsville.

Plans were examined and verbal recommendations given for the Toledo & Ohio Central Railway passenger depot at Wapakoneta and for the court house at Kenton.

The Secretary has reviewed the reports and receipts of the State Inspector of Plumbing and finds that fees to the amount of $85.00 were collected during the month of October.

Since the last report 100 different places have been visited by a representative of the Board and 290 inspections made. Of these, 157 were made by a representative of the Division of Occupational Diseases; 75 by a representative of the Division of Engineering; 37 by the State Inspector of Plumbing; 14 by the epidemiologist; 4 by medical inspectors and 3 by the Secretary.

In addition to these inspections 46 visits were made by a representative of the Division of Tuberculosis, and 24 lectures were given at the Public Health Exhibit by a member of the staff; and the exhibit director is in constant attendance.

PUBLIC WATER SUPPLIES

REPORT ON DETAIL PLANS FOR PROPOSED NEW WATER SUPPLY FOR AKRON.

On November 13, 1913, detail plans for the development of a proposed new water supply for Akron, prepared by Messrs. F. A. Barbour and E. G. Bradbury, consulting engineers, were received from Mr. R. M. Pillmore, director of public service. On November 11, 1913, the chief engineer visited Akron and conferred with the consulting engineers relative to the design. After an examination of the plans the following report was submitted:

Akron, a city with a population of 77,000, is located in Summit County on the Little Cuyahoga River just above its confluence with the Cuyahoga River. The city is an important manufacturing center and its growth during recent years has been flourishing. Owing to the rapid growth of the city its public water supply and sewerage facilities have become inadequate and for the past two years studies have been made for improving the water supply and sewerage of the city.

At the present time the water supply is obtained from Summit Lake and treated with calcium hypochlorite to destroy pathogenic bacteria. This supply, originally of private owenership, was purchased by the city in 1912. It is of unsatisfactory quality due to the pollution of Summit Lake resulting from both domestic sewage and liquid industrial wastes created by rubber and salt works located near the lake. Furthermore, this source of supply is of inadequate quantity for the future requirements of the city.

In August 1911 the city received a report from its consulting engineers upon a proposed new water supply for the city. This report contained definite recommendations for the abandonment of the existing supply and the utilization of the Cuyahoga River as a source. It was adopted by the city council and submitted to the State Board of Health March 4, 1912. At a meeting held March 21, 1912, the Board approved the general plan for a proposed new water supply for Akron, as outlined in the above mentioned report. A condition of this approval, however, required the submission to and approval by the Board of detail plans for the development.

The plans submitted November 13, 1913, give details of a proposed storage reservoir on the Cuyahoga River, a proposed water purification plant, and a proposed distributing reservoir. A daily capacity of 20,000,000 gallons is to be provided immediately and an ultimate capacity of 35,000,000 gallons may be secured by enlargements.

PROPOSED STORAGE RESERVOIR.

The impounding dam in the Cuyahoga River will be placed at a point 10.4 miles east of the city and about 1.5 miles above the village of Kent. Above this point the river has a watershed area of 214 square miles. The watershed is level, contains considerable swamp land, and is largely devoted to agricultural pursuits. The fall above Kent in the stream is only 7 feet in a distance of 30 miles and it will, therefore, be seen that the stream is not subject to rapid fluctuations in flow. The population on the watershed is largely rural. The only communities are Mantua, Hiram, Burton and Middlefield, each of which has a population of less than 1,000.

Below elevation 273 the reservoir will be cleaned and grubbed of all trees, bushes, vines and brush. Between elevations 273 and 280 the reservoir will be cleaned but not grubbed. Stumps of trees, one foot or more in diameter, will be left at a height one foot from the ground; from 4 inches to 1 foot diameter, six inches above the ground; and all smaller trees, bushes, vines and brush will be sawed off flush with the surface.

The storage dam will be a hollow reinforced concrete structure, the spillway being 280 feet in length with an additional length of earth embankment of 175 feet. The elevation of the spillway, 270, is 19 feet above the bottom of the reservoir and 24 feet above the base of the dam. The reservoir formed will cover an area of 769 acres. Its holding capacity above elevation 255 will be 2,385 million gallons. The water may be drawn off at any desired depth and when the reservoir is at sufficient elevation will be passed through water turbines for the generation of electric power which will in turn be utilized in the operation of rotary pumps at the purification plant and pumping station. The raw water will be conveyed from the reservoir to the purification plant through a 60-inch reinforced concrete and 48-inch cast iron conduit.

PROPOSED WATER PURIFICATION PLANT.

The design provides for the installation of a water purification plant of the gravity rapid sand type with a nominal capacity of 20,000,000 gallons per day. The plant will be located in the valley of the Cuyahoga River between the right-of-ways of the Cleveland and Pittsburg and Lake Erie and Pittsburgh Railroads, a short distance west of the stream and about 2,500 feet downstream from the storage dam.

The main features of the proposed purification plant include the following: raw water well; raw water conduit; aerator; devices for chemical treatment, coagulation basins, filters and clear well. A brief statement as to the passage of the water through the plant may be of value before describing the various devices. The raw water from the storage reservoir above the dam, the spillway of which is at elevation 270, is conveyed through a 60-inch reinforced concrete and 48-inch cast iron gravity conduit, discharging into the raw water well, the high water elevation of which is controlled by a float valve at 267.5. In normal operation, when the raw water is free from offensive odor, it will flow by gravity from the raw water well through the raw water conduit to the mixing chambers where the chemicals will be applied and mixed with the water. The treated water will then pass through the coagulation basins and thence to the filters. The filtered water will enter the clear water well from which it will flow to a clear water suction well, from which the high service pumps will draw the supply for the city. At times when the raw water has objectionable odors, or when the elevation in the storage reservoir is too low to permit of gravity operation, the water will be pumped from the raw water well by low lift pumps and discharged through an aerator, from which the water will return to the mixing chambers.

Raw Water Well and Conduit. The raw water well, which is placed in one corner of the head house, is rectangular in plan, 10 feet in width and 35 feet in length, having a depth to the high water line of 23 feet. The 48-inch gravity conduit enters just above the floor line, and with the normal method of operation the raw water will leave the well over an overflow weir 5 feet in width, the crest of which is 2.5 feet below the high water line. Vertical copper screens of $\frac{1}{4}$-inch mesh will be placed in the raw water well to remove the coarser suspended matter in the water. A 30-inch suction, leading to the low lift pumps, provides means whereby the raw water may be pumped from the well at elevations below the overflow weir. The raw water conduit has a semi-circular-rectangular section 5 by 5 feet and is constructed of reinforced concrete.

Aerator. The aerator is an open concrete structure elliptical in shape and 54 feet by 74 feet in plan, 18 inches in depth at the outer wall, and 3 feet in depth at the center. The raw water is pumped to the aerator through a 24-inch main, to which are connected four manifold lines of 12-inch pipe placed beneath the floor of the aerator. From the manifold piping 68 nozzles extend to an elevation 13 inches above the floor, at which point the raw water is discharged. The water is collected from the sloping floor of the aerator into a central well through which a 30-inch gravity conduit leads to the mixing chambers.

Devices for Chemical Treatment. At times when the river water has insufficient alkalinity it is proposed to apply soda ash to facilitate the alum reaction. At all times the raw water will be treated with a solution of aluminum sulphate as a coagulant. To increase the efficiency of the plant and insure bacterial purity of the effluent the filtered water will be treated with chlorine as an oxidizing agent. The chlorine will be used in a liquid form and applied through special governing apparatus.

The solution tanks for the soda ash are rectangular concrete structures, each 9 feet by 9 feet in plan, and 8 feet 3 inches deep to the high water line. Those for the alum solution are 12.5 feet by 12.5 feet in plan and 8 feet 3 inches deep. Two tanks are provided for the soda ash solution and three tanks for the alum solution. The chemicals will be dissolved in boxes extending along the sides of the tanks and provided with screen bottoms. The tanks will be equipped with motor driven agitators to insure uniformity of the solution. The soda ash and coagulant solutions will be fed through constant head adjustable orifice tanks and will be applied through grids to assist in distribution.

Liquid chlorine will be applied in small quantities to the filtered water in the clear water suction well. A special device in duplicate, manufactured by The Electro Bleaching Gas Company, furnished on guarantee, will be used.

Mixing Chambers. After treatment with the soda-ash the water will pass through a mixing chamber designed to bring the chemical into contact with all portions of the raw water. This mixing chamber is 24 feet 8 inches by 29 feet 8 inches in plan, 7 feet deep to the flow line and is subdivided into five sections by horizontal baffles. When the plant is operated at its nominal capacity of 20,000,000 gallons per 24 hours or 1850 cubic feet per minute, the velocity is amply sufficient to prevent deposition. The soda-ash mixing chamber will be bypassed when the alkalinity of the river is sufficient without the use of the chemical.

The water from the soda-ash mixing chamber will receive the alum treatment and will pass through a second mixing chamber. This is 21 by 22 feet in plan, 6 feet deep and is subdivided into five sections by horizontal baffles. When the plant is operating at its nominal capacity the velocity through the chamber will be 77 feet per minute and the retention period will be 1-⅓ minutes. The velocity is sufficient to prevent deposition and the retention period is not great enough to introduce danger of formation of the coagulant within the chamber.

Coagulation Basins. The coagulation basins are constructed in three units, each 54 feet 10 inches by 167 feet 6 inches and 10 feet in depth. The basins will be built of reinforced concrete with groined arch floors and roof. The treated water is discharged into each unit through a 36-inch inlet and after passage around a longitudinal baffle is drawn off over a broad crested weir placed 2.5 feet below the flow line. The settled water passes into an outlet conduit leading to the filters. The floors of the coagulation basins are sloped to central gutters, leading to a sludge chamber from which the waste water may pass into a sewer. The capacity of the coagulation basins is 2,000,000 gallons, which furnishes a retention period of 2.4 hours when the plant is operated at its nominal capacity.

Filters. The filter tanks will be constructed of reinforced concrete and superimposed over a clear well. They will be arranged in two rows of five units each, separated by a pipe gallery. Each unit will have an area at the sand line of 696 square feet and a capacity of 2,000,000 gallons; the total capacity will, therefore, be 20,000,000 gallons per

24 hours. The floors of the filters are of special design, known as the Wheeler Filter Bottom, which is somewhat different from any design heretofore used. Immediately above the floor proper of the unit a false bottom will be constructed by the use of special concrete slabs placed over a main central and lateral channels. The concrete slabs are cast with inverted pyramidical depressions with $\frac{3}{4}$-inch openings at the apex connected downward with the channels referred to. These openings will be placed 12 inches on centers and will, therefore, be 696 to the unit. The pyramidical depressions will be filled with specially prepared spheres of Portland cement mortar, 3 inches in diameter and glaced earthenware $1\frac{1}{2}$ inches in diameter. Above the slabs forming the false bottom will be a 6-inch layer of graded gravel, supporting 30 inches of sand. The edges of the wash water gutters will be placed 21 inches above the sand line, which will necessitate a rather hard wash to properly clean the filters. The wash water troughs are placed so that they discharge into a central drain, which extends lengthwise of the unit, separating it into two portions. Wash water will be supplied from a circular covered reinforced concrete tank 16.25 feet in diameter and 11.5 feet deep. The capacity is 17,850 gallons and the elevation of the high water line is 30.5 feet above the edges of the wash water troughs. The effluent from the filters will be collected through outlet piping passed through rate controlling devices and discharged into the clear well.

The pipe gallery, which separates the two rows of filters, is 16 feet in width, and is ample to provide means of access to the valves and piping. During periods of extreme high water in the river it will be necessary to pump the waste water to discharge it from the plant. For this purpose a waste water tank with pumping equipment is provided. All valves will be actuated by hydraulic power and operated from tables at each unit. Indicating and recording rate of flow gages and loss of head gages will be placed at each filter.

Clear Well. The filtered water enters a small clear well beneath the filters. This is separated into two portions by the pipe galleries, each portion being 28 feet in width, 138 feet in length, and 11 feet in depth. The total capacity is, therefore, 637,000 gallons. This capacity is not designed to furnish storage for any extended periods owing to the provision of a distributing reservoir within the city having a capacity of 20,000,000 gallons, which will provide for any interruptions in the operation of the plant.

From the clear well two 30-inch lines will convey the water to a clear water suction well from which the high service pumps will take their supply. The clear water suction well is of satisfactory design, but is located adjacent to and separated by a single wall from the raw water suction well, raw water conduit and waste water tank, each of which will contain polluted waters, which might contaminate the filtered effluent. An objection might also be raised to the fact that the clear water well proper is separated from the raw water well and settled water conduit by a single wall. However, the walls separating these portions of the plant are 18 inches to 24 inches in thickness, are heavily reinforced, and will be constructed of 1-2-4 concrete. Watertightness should be secured and is guaranteed by the consulting engineers.

PROPOSED PUMPING STATION AND DISCHARGE MAIN.

The purified water will be pumped from the plant to the city by two 15,000,000 triple expansion high duty units. These and the other accessories for the station will be housed in a structure adjoining the water purification plant. The water will be discharged through a 36-inch iron force main 10.2 miles in length to a distributing reservoir to be located east of the city. The total lift from the high water elevation of the clear water suction well to the high water elevation of the distributing reservoir will be 160 feet. The force main will not be tapped for service at any point between the pumping station and reservoir.

PROPOSED DISTRIBUTING RESERVOIR.

The distributing system of the city will be supplied by gravity from a reservoir located at the summit of a hill about one-half mile east of the easterly corporation line. The reservoir will be constructed partly in excavation of reinforced concrete throughout. It will be rectangular in plan, 310 feet 11 inches square, and 30 feet deep to the flow line, and will have a capacity of 20,000,000 gallons. The concrete roof will be covered with a 21-inch layer of earth and will be supported on columns placed 14 feet 5 inches on centers. The inlet consists of a 36 inch reinforced concrete conduit extending from the force main across the center line of the reservoir on the bottom. This conduit is provided with ten, 12-inch circular openings placed 16.5 feet on centers and staggered five on each side of the conduit. By this means good circulation within the reservoir will be secured. The outlet is through a sump connected with a 36-inch iron conduit leading to the distributing system of the city. An overflow is provided in the gate house by which the high water elevation of the reservoir is controlled.

SUMMARY.

The detail plans for development of a proposed new water supply for Akron provide for installations which will secure for the city an ample supply of water of good quality. The raw water will be obtained from a storage reservoir of sufficient size to insure a daily supply of 30 million gallons. It will be satisfactorily grubbed and cleared to keep the water in good condition for treatment. The water purification plant will be of sufficient capacity to furnish 20 million gallons per 24 hours, and its design is such as to provide a well purified effluent. The facilities for pumping, storing, and distributing the supply are also ample and contain no defects as a result of which the supply could deteriorate.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the detail plans for the development of a proposed new water supply for Akron, to be obtained from the Cuyahoga River at a point about 1.5 miles above Kent, purified by a plant of the gravity rapid sand type, and distributed through a reservoir about one-half mile east of the city, received from Mr. R. M. Pillmore, director of public service, November 13, 1913, subject to the following conditions:

1st. That a chemist, expert in the operation of water purification plants, shall be employed by the city to superintend and control the operation of the proposed plant; and that daily records of efficiency and operation shall be submitted to the State Board of Health at monthly intervals;

2nd. That samples of all grades of filtering material shall be submitted to and receive the approval of the State Board of Health before the material is placed; and,

3rd. That this approval shall be void unless the proposed new water supply shall have been developed in accordance with the above mentioned detail plans prior to June 1, 1915.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR ALLIANCE.

On October 23, 1913, plans for a proposed additional water supply for Alliance were received from Mr. D. M. Armstrong, director of public service. The plans were referred to the engineering department and the following report was submitted:

Alliance, a city with a population of about 16,000, is located in Stark County, on the Mahoning River. Its public water supply was installed in 1883, being obtained from the Mahoning River at a point in the extreme northerly portion of the present corporation and furnished to the consumers without treatment. The supply was originally owned by a private company but was purchased by the city in 1899. In 1904, owing to the unsatisfactory quality of the raw river water the city made surveys to locate a satisfactory ground water supply. Several wells were drilled near the pumping station, and in October 1904 the State Board of Health approved of well No. 1 as an additional water supply for the city. The surface supply was continued in use, however, and due to its extreme hardness the well supply was used only in cases of emergency. During 1909, 1910, and 1911 further steps were taken to secure a suitable ground water supply and wells were drilled near the pumping station and at various points in the vicinity of the city. No definite request for approval of these wells as sources of supply was made but pumping equipment was provided whereby the wells near the pumping station could be utilized. During periods of shortage of the river supply, the wells have been used since 1910.

In October 1912 the State Board of Health approved plans for a water purification plant to be installed near the pumping station for the treatment of the supply obtained from the Mahoning River. This plant has been constructed during the past year and was placed in full operation the early part of September 1913. At the present time the entire supply is obtained from the Mahoning River and is purified by passage through the recently constructed plant.

At the time of the construction of the water purification plant the financial condition of the city was such that it was impossible to provide a plant of more than 6,000,000 gallons capacity. The average daily consumption of water at Alliance is approximately 3.6 million gallons and the maximum exceeds 4,000,000 gallons per day. The maximum hourly consumption frequently exceeds a rate of 6,000,000 gallons per 24 hours, which is the safe rate of operation of the filters. During such periods it is necessary to depend for the supply upon the storage afforded by the clear well. For the reasons before stated a small clear well was provided which has a capacity of only 131,000 gallons, equivalent to a storage period of one-half hour when the pumpage is at the rate of 6,000,000 gallons per day. It is probable that a considerable reduction in the pumpage would result if meters were generally installed throughout the city. The installation of meters is being considered by the city authorities but some steps must be taken to increase the available supply of purified water pending the installation of meters.

An increased supply of filtered water could be secured by the installation of additional filter units or by increasing the capacity of the clear well, but the financial condition of the city will not permit of these improvements. An alternate method of supplementing the supply of purified water is the utilization of existing wells located near the pumping station. It is this method which is proposed by the city authorities.

Proposed Additional Supply. The plans received October 23, 1913, provide for the utilization of five existing wells located in a group at a point 400 feet southeast of the present pumping station, about 120 feet south of the water purification plant. These wells were installed at various times from 1909 to 1911 and are at present provided with air lift equipment and discharge lines leading to an old surface reservoir near the pumping station. The wells are each 80 feet deep and are cased the entire depth. The water is obtained from a gravel formation and rises under a static head to an elevation slightly above that of the river. The location of the wells is satisfactory as regards the proximity of possible sources of pollution. The only undesirable feature is the existence of a sewer extending along the southerly bank of the Mahoning River about 300 feet from the wells, which carries the effluent from the old sewage treatment works located some 400 feet upstream. The probability of pollution from this source is, however, remote.

The quality of the water obtained from the wells is demonstrated by the examination of samples collected May 26, 1911, and September 25, 1913. The results indicate that the water is of good hygienic quality and its principal objection is in its mineral content. It is excessively hard and contains a readily oxidized iron content which causes a decided turbity. It has been due largely to the hardness of the supply that its use has been restricted to emergencies in the past. In the development of the proposed additional supply it is intended to install a covered rectangular reinforced concrete receiving well to which the discharged lines from the wells will be connected. The bottom of the receiving well will be placed at the same elevation as the top of the clear water well at the water purification plant and a 12-inch cast iron gravity line 300 feet long will convey the water from the receiving well to the clear water well.

The use of the ground water supply to supplement the filtered supply is satisfactory as regards any effect upon the sanitary quality of the latter; however, the objectionable mineral content of the well water renders it decidedly unsuitable as an additional supply unless proper precautions are taken to prevent deterioration of the entire supply by the precipitated iron. Although the well supply will be utilized at intervals it is inevitable that the easily precipitated iron will be deposited in the clear well unless a deferrization plant is installed to improve the quality of the water as it comes from the wells. If the deposits are permitted to enter the clear well suitable valves, drains and suction lines will be required to facilitate the removal of the deposits.

SUMMARY.

The recently completed water purification plant at Alliance is of inadequate capacity to supply sufficient filtered water during the peak load. Preferably this condition should be met by enlargement of the plant. The financial condition of the city prevents an expenditure for this purpose and it has been decided to utilize a ground water supply. This supply discharged into the clear well will carry sufficient iron to render the filtered supply objectionable unless proper provision is made for the removal of the iron before it is discharged into the clear well or for the removal of the deposits which will form in the well.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved this proposed additional water supply for Alliance, to be obtained from drilled wells some 400 feet southeast of the waterworks pumping station, as shown on plans received from Mr. D. M. Armstrong, director of public service, October 23, 1913, subject to the following conditions:

1st. That provision, satisfactory to the State Board of Health, be made to prevent deterioration of the purified effluent of the water purification plant by admixture of the iron-bearing well water by one or both of the following methods:

(a) The installation of a deferrization plant to improve the quality of the proposed additional supply before it is discharged into the clear well.

(b) The installation of suitable valves, drains and suction lines to facilitate cleaning of the clear well.

2d. That the proposed additional supply shall be used only at times when it is necessary to supplement the filtered supply; and that it shall be abandoned as soon as the water purification plant shall have been enlarged to a sufficient capacity; and,

3d. That this approval shall be void unless the foregoing first condition shall have been complied with prior to June 1, 1914.

The city officials were advised that in the opinion of the State Board of Health it would be preferable to increase the available water supply by providing additional filters or filtered water storage, or both, instead of utilizing the wells as proposed.

EXAMINATION OF WATER FROM ALLIANCE.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
10322	1911 May 26	8	33	decided	musty ..	.7	.028	.292	0	.2
13462	1913 Sept. 25	0	21	v. distinct	sl. musty.	.69	.068	.546	.001	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria.	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
10322	16.5	358	117.5	763	64	6.2	22	Not in 10cc.
13462	30.5	248	137.5	596	44	4.6	100	Neg. 10cc.

Source of Samples:

10322 — Drilled well No. 1, 81 ft. deep, cased to bottom and located in gravel.
13462 — Wells used as additional public water supply.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR ATHENS.

On May 2, 1913, a request for an examination of a proposed additional water supply for Athens was received from Mr. R. D. Williams, director of public service. One of the assistant engineers visited Athens and examined the proposed improvement on May 19, 1913, and later on June 13, 1913, collected a sample from the additional well. The following report upon the proposed additional supply was submitted:

Athens, a city with a population of 6,200, is located in Athens County on the Hocking River. The topography of the city and surrounding country is very hilly and the only extensive level ground is found in the valley of the Hocking River. The drainage from the city reaches the river, which flowing from the north encircles the westerly, southerly, and easterly portions of the city, thence following an easterly direction.

The city is provided with a public water supply derived from wells, a municipal lighting plant, some fourteen miles of paved streets, and a fairly complete system of sewers constructed on the separate plan.

EXISTING WATER SUPPLY.

The water supply of Athens was installed in 1894 and until 1901 the supply was derived from a dug well in the valley of the Hocking River west of the city. During 1901 and 1902, owing to the failure of the dug well to supply sufficient water, three tubular wells, known as wells Nos. 1, 2, and 3, were drilled on the waterworks property near the dug well.

At this time the dug well was converted to a collecting well by constructing a concrete floor and making the walls watertight. In 1908 the available water supply was further increased by the addition of four tubular wells known as Wells Nos. 4, 5, 6, and 7. At the present time all of the wells, with the exception of Well No. 5, are in use. The wells are pumped by air lift discharging by gravity into the collecting well.

There are several features in connection with the existing supply which are unsatisfactory. The general location of the wells being to the west of the city and in an upstream direction is satisfactory, but there are several dwellings in the vicinity of some of the wells which are a menace to the quality of the water supply. Well No. 5 is especially unfavorably located, and this well was disapproved as a source of water supply in an action of the State Board of Health taken October 20, 1908. The other wells are less dangerously located although within a radius of 500 feet of the wells Nos. 1 to 6, there are seven dwellings accompanied by the usual insanitary privy vaults, and one privy is within 500 feet of wells Nos. 7 and 8. Past analyses of the water supply have indicated a polluting influence of these privies upon the water supply. The most recent analysis of a sample collected May 19, 1913, indicated serious contamination of the supply. It is apparent that the existing supply wells must be protected by improving the sanitary conditions of the surroundings if they are to be retained as sources of public water supply.

The development of the wells is not entirely satisfactory. They are pumped by air lift, the discharge taking place in cisterns constructed of a few lengths of vitrified sewer pipe set on end, covered with a conical galvanized iron roof and discharging into a gravity collecting conduit of vitrified pipe. The well cisterns are unsubstantial and of insufficient height to prevent the entrance of flood waters. In view of the frquency of flooding of the land surrounding the wells, it is of the utmost importance that the structures be of greater strength. The height of the cisterns should be increased to prevent the entrance of flood waters. The gravity conduit should be replaced by a watertight line of cast iron pipe.

PROPOSED ADDITIONAL WATER SUPPLY.

Two of the existing wells, Nos. 7 and 8 are located in a northwesterly direction from the pumping station in a line running north and south, paralleling the valley of the river. It is proposed to obtain an additional supply from a drilled well situated in the same line, about 200 feet north of well No. 8.. The city has purchased a strip of land 25 feet wide, extending 1,200 feet north from the existing wells Nos. 7 and 8 to the Hocking River, which may be ultimately used for further well extension. It should be noted that the development of wells in a line paralleling the river is not calculated to produce the maximum yield which may be obtained. A more logical development would be in lines crossing the valley. The proposed additional well is more suitably located as regards the proximity of possible sources of pollution than any of the existing supply wells. Future development of wells should take place in the territory lying west of the recently acquired water works property. This portion of the valley is free from visible polluting influences.

The formations penetrated by the existing wells are given in the following list and these probably represent the formations penetrated by the proposed additional well:

Clay	18 feet
Waterbearing gravel	20 feet
Blue soapstone rock	10 feet
Waterbearing sandstone	4 feet
Blue soapstone	13 feet
Waterbearing sandstone	3 feet
Blue clay and soapstone	41 feet

The water is derived from the waterbearing gravel encountered 18 feet below the surface, and from the underlying rock formations. The existing wells and proposed well are cased to a depth of 38 feet, the lower portion of the casing being perforated to admit water from the gravel.

The quality of the water from the proposed additional well is demonstrated by the analysis of a sample collected June 13, 1913, after twenty-four hours' continuous pumping of the well. The results indicate that the water is of a high degree of purity from a sanitary standpoint and the only objectionable characteristic is the abnormal iron content. It is probable that with continuous pumping of the well the iron content will reduce. The mineral characteristics of the water are similar to the existing water supply, but the analyses indicate the water from the proposed well to be of much better sanitary quality.

SUMMARY.

From the foregoing report it will be noted that the present water supply of Athens is subject to pollution from nearby privies. Although the Board has advised the removal or reconstruction of these privies, and in the approval of an additional water supply October 20, 1908, provided that such removal or reconstruction should be accomplished, the city has failed to improve conditions surrounding the wells. The equipment for pumping the wells is in an unsafe condition and should be improved by providing more substantial well cisterns, and a watertight gravity conduit.

The proposed additional water supply will be of a quality better than the existing supply. Future development of wells should take place in a direction west of the property upon which the proposed additional supply well is located.

ACTION OF THE BOARD.

At a meeting held June 26, 1913, the State Board of Health approved this proposed additional water supply for Athens to be obtained from drilled wells north and west of the existing supply wells Nos. 7 and 8 and south and east of the Hocking River subject to the following conditions:

1st. That the proposed additional wells, and such existing wells as are retained in use, shall be developed according to plans approved by the State Board of Health; said plans to provide substantial water-tight cisterns, a water-tight cast iron conduit, and an elevation of the cisterns and collecting well above maximum high water of the Hocking River;

2nd. That prior to June 1, 1914, all existing wells, excepting Nos. 7 and 8, shall be abandoned;

3rd. That the council shall pass an ordinance prohibiting the establishment or maintenance of any leaching privy vault, or cesspool, or other source of pollution of the public water supply, within 500 feet of any well; and,

4th. That this approval shall be void unless plans for the development of the proposed additional supply shall have been submitted prior to September 1, 1913.

The city officials were advised as follows:

1st. Analytical evidence indicates that the existing water supply is contaminated by the influence of privy vaults near the wells;

2nd. The development of the existing wells is unsafe owing to the possibility of contamination of the supply through the cisterns and gravity conduit; and,

3rd. The territory lying north and west of the existing wells Nos. 7 and 8, and south and east of the Hocking River, is free from visible polluting influences and should be developed to provide for the abandonment of wells Nos. 1 to 6.

EXAMINATION OF WATER FROM ATHENS.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.
12527	1913 May 19	0	none	vy. sli.	none	.35	.014	.062	.008	1.2
12646	June 13	0	11.	slight	none	.44	.030	.422	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation. Total.	Residue on Evaporation. Loss on Ignition.	Iron.	Bacteria Number per cc.	Bacteria Colon Present.
12527	70	189	115.	547.	118.	.6	4,200	Pos. 10 c. c.
12646	22.8	186.	72.5	383.	44.	1.3	18	Neg. 10 c. c.

Source of Samples.

12527 — Existing Supply.
12646 — Proposed additional supply.
The above samples were collected by H. E. Babbitt.

REPORT ON PROPOSED NEW WATER SUPPLY FOR THE ATHENS STATE HOSPITAL.

In March, 1913, it was learned that a proposed new water supply was being constructed at the Athens State Hospital. Previous to this no plans had been submitted to the State Board of Health for approval. On March 24, 1913, one of the assistant engineers visited the Athens State Hospital and investigated the progress of the improvements. Subsequently the Ohio Board of Administration was requested to submit plans for the development. On May 19, 1913, a second investigation of the proposed improvements was made by one of the assistant engineers. On May 23, 1913, plans for the proposed new water supply were received from the Ohio Board of Administration. After an examination of the plans, the following report was submitted:

The Athens State Hospital is located on elevated ground south of the Hocking River opposite the city of Athens. The institution was established in 1873 as an asylum for the insane. It is provided with a public water supply, and sanitary sewerage facilities. The general sanitation of the grounds and buildings appears to be good. The institution grounds have an area of about 800 acres, and the population is about 1,500.

EXISTING WATER SUPPLY.

The water supply will be briefly described as it existed prior to the installation of the recent improvements. Two water supplies were installed, one for fire protection and general use, and the other for drinking and cooking purposes. The supply for fire protection was obtained from a dug well 26 feet in diameter and 30 feet deep penetrating the drift deposits in the valley of the Hocking River, and two drilled wells 8 inches in diameter by 125 feet deep, installed to augment the dug well supply. The wells were pumped by air lift discharging into an artificial system of lakes from which the suction to the service pumps was taken. The supply from the lakes was pumped to an open brick distributing reservoir on a hill near the institution from which it flowed by gravity to the various buildings.

The supply for drinking and cooking purposes was obtained from a drilled well near the site of the general supply wells being pumped to a tank located in the main building from which it was discharged by gravity to the various buildings. It should be noted that the existence of the dual supply resulted in an indiscriminate use of both supplies for general purposes.

The quality of the water supply as derived from the wells has been of good quality from a sanitary standpoint. The water, however, is hard and contains an excessive iron content which imparts objectional characteristics. The storage of the supply in the lakes referred to has accomplished good removal of the iron and, therefore, no serious complaint against this objectionable feature of the supply has been encountered.

The recent improvements in the water supply have been made to provide a single supply of satisfactory quality to serve the purposes of the dual supplies previously maintained. The lakes in which the water has been stored receive a limited amount of surface drainage and are subject to flooding during high stages of the Hocking River. Consequently they cannot be considered as entirely safe sources of water supply, and it was decided to abandon the lakes as sources of supply or storage reservoirs.

PROPOSED NEW WATER SUPPLY.

Briefly the plans for the proposed new water supply provide for the improvement of the three existing drilled wells, the addition of three similar drilled wells, the installation of a gravity conduit, collecting reservoir, new pumping machinery, and standpipe. As developed the wells will be pumped by air lift discharging by gravity to the collecting well from which the water will be lifted to the distribution system and standpipe.

Site. The location of the proposed new supply wells is in the valley of the Hocking River about ¼ mile north of the institution buildings. From a sanitary standpoint the location is satisfactory and there are no visible evidences of pollution of the supply. In the construction of a new pumping station, sanitary closets have been installed, the wastes from which must be properly disposed of to avoid contamination of the wells. Plans for the proper disposal of the sewage should be submitted to the State Board of Health. The new wells will be placed near the old wells adjacent to the chain of lakes, above mentioned, and at distances varying from 1,100 to 1,600 feet east of the pumping station.

Wells. The existing and proposed wells which have already been installed have a depth of about 125 feet. It is probable that the water is obtained through perforations in the casings from gravel deposits about 20 feet in thickness overlying impervious layers of shale and sandstone, into which the casings are extended. The wells are cased with 8-inch wrought iron casings within which is placed the air lift apparatus. The tops of the casings enter covered concrete cisterns 5 feet square in plan, extending above maximum flood elevation of the Hocking River. The air lift discharge line extends through a cap at the top of the casing and is provided with an umbrella deflector. A 6-inch cast iron pipe connects the basin with the gravity conduit.

Conduit. The conduit for conveying the waters to the collecting well is constructed of 8-inch vitrified sewer pipe surrounded on all sides with concrete. The conduit was laid without observance to constant grade and in its construction considerable difficulty was encountered in securing watertightness. As completed the conduit follows a very irregular grade. Owing to its elevation the conduit is under pressure while the wells are in use, which makes it impossible to obtain a free flow through it. This pressure will probably result in leakiness of the line and when the wells are not in service the leakage may permit the entrance of shallow ground water which may be polluted, especially when the surrounding territory is flooded.

Collecting Well. The plans provide for a collecting well constructed of concrete 35.5 feet by 19.5 feet in plan, and 11 feet in total depth. Foundations for the pumping engines are carried through the basin and its total capacity is about 49,000 gallons. The gravity conduit enters the basin at an elevation of about 3½ feet above the floor, and to provide free flow from the conduit it is necessary to keep the basin pumped down to this level. The effective capacity to this elevation is about

16,000 gallons. The basin is covered with a concrete roof to protect the supply from deterioration. An overflow, not shown on the plans, has been installed. This overflow is not provided with a valve and, therefore, will permit the entrance of flood waters into the well.

Pumping Equipment. Although not indicated on the plans a new pumping station and equipment have been installed. The equipment comprises a new air compressor and two new McGowan service pumps.

Quality of Water. Previous analyses of the existing water supply, and analyses of the proposed new water supply have indicated that the water obtained from the gravel deposits of the Hocking River is satisfactory from a sanitary standpoint. The water is, however, hard and high in iron content. The objection to the iron content has been avoided by the use of the lakes which provided sufficient storage for the removal of the iron. With the abandonment of this feature it is to be expected that the iron will cause serious complaint.

SUMMARY.

A new water supply for the Athens State Hospital has been installed without having received the approval of the State Board of Health. The supply as derived from the wells is of satisfactory quality with the exception of its hardness and iron content which latter requires removal. The construction of the gravity conduit is objectionable in that it is not watertight and is therefore subject to the entrance of shallow ground water. The overflow from the collecting well should be provided with a valve.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the proposed new water supply for the Athens State Hospital, obtained from drilled wells in the valley of the Hocking River about one-quarter mile north of the institution buildings, developed according to plans received May 23, 1913, from the Ohio Board of Administration, was approved subject to the following conditions:

1st. That an iron removal plant of a design satisfactory to the State Board of Health shall be installed;

2nd. That the collecting conduit of vitrified sewer pipe shall be replaced with a cast iron pipe line with leaded joints;

3rd. That a gate valve shall be provided on the overflow line from the collecting well;

4th. That the sewage from the water works pumping station shall be disposed of in a manner satisfactory to the State Board of Health; and,

5th. That this approval shall be void unless revised plans incorporating these features shall have been submitted to the State Board of Health prior to October 1, 1913.

REPORT ON PROPOSED WATER SUPPLY FOR BALTIC.

On October 3, 1913, plans and specifications for proposed water supply for Baltic, prepared by Mr. George E. Arnold, engineer for the village, were received from Mr. Seth Gerber, clerk of the board of trustees of public affairs. The plans and specifications were referred to the engineering department and the following report was submitted:

Baltic, a village with a population of about 400, is located in the extreme westerly portion of Tuscarawas County, on the west fork of Sugar Creek, a tributary of the Tuscarawas River. The stream flows in a northerly direction through the central portion of the village. The topography of the surrounding country is rather hilly but the main portion of the village lies in the level valley of the stream. The underlying rock formations consist of shales and sandstones interlaid with coal seams and the drift deposits which are of glacial origin are of a clayey nature. The drift is not waterbearing.

PREVIOUS ACTION OF THE STATE BOARD OF HEALTH.

In April 1912, the State Board of Health considered a site for the location of public water supply wells at Baltic. After due study of the local conditions, the Board approved a site situated 800 feet south of the southerly corporation line of the village and east of the west fork of Sugar Creek. The conditions of approval of this site required that the supply be obtained from a depth of at least 50 feet, that an area of at least one-half acre be purchased for water supply purposes, and that the quantity, quality, and plans for development of the supply should be satisfactory to the State Board of Health.

Following this approval the village proceeded to drill a well at the approved site and to test the same for quantity and quality. A representative of the engineering department visited Baltic and examined the test well on June 11, 1913.

PROPOSED WATER SUPPLY.

The plans of the engineer provide for the installation of one or more wells to be pumped directly into the distributing system, storage, and equalization of pressure to be provided by a reservoir placed upon a hill a short distance east of the village.

Site. The location of the public water supply wells has already been approved by the State Board of Health. The site is about 800 feet south of the village at the edge of the valley of the west fork of Sugar Creek and immediately east of Ray Street extended. The site is satisfactory from a sanitary standpoint and there are but three dwellings within 1,000 feet. The surface drainage from these dwellings cannot reach the wells due to the existence of a ravine which intercepts it. It would appear therefore, that the supply is not endangered by these dwellings. The village has purchased an area of one-half acre as required by the State Board of Health.

Wells. Although the plans provide for the installation of two wells it is proposed to install a single well at the present time. The well is 232 feet in depth and is cased with 8-inch wrought iron pipe to a depth of 95 feet. It penetrates the following formations:

Clay	5 feet
Slate	14 feet
Limestone	1 foot
Fireclay	25 feet
Shale	12 feet
Slate	5 feet
Sandy shale	7 feet
Coal	1 foot
Clay	10 feet
Slate	26 feet
Limestone	4 feet
Sandy shale	4 feet
Sandstone	118 feet

The water is obtained from the sandstone formations and stands one hundred feet from the surface when the well is not being pumped. When the well is pumped at a rate of 65 gallons per minute the water level is lowered somewhat. The capacity of the well as determined by a pumping test is 50 gallons per minute, corresponding to 30,000 gallons during 10 hours pumping which will supply the village.

Quality of Water. Following a pumping test two samples of the proposed supply were collected June 11, 1913. The analyses of these samples indicate that the supply is of good quality from a sanitary standpoint. The bacterial content is quite high but intestinal organisms were absent in 10 c.c. portions. The high bacterial content is probably due to the newness of the well and will no doubt be reduced by continued pumping. In spite of the depth of the well the chemical characteristics of the water are not unfavorable. The hardness is rather high but consists entirely of temporary hardness which is removed by boiling. The iron content is greater than is desirable but will no doubt reduce somewhat as a result of continued use of the well. In general it may be said that the quality of the supply is satisfactory for general purposes.

Water Works Equipment. The water will be lifted from the well and discharged directly into the distributing system by means of a deep well pump driven by an oil engine. The pump will be set directly over the well and a casting will protect the top of the casing from pollution. The working barrel will be placed at about 100 feet below the surface and a suction pipe will extend to an additional depth at present not determined. A revolution counter will be provided to measure the quantity of water pumped. The distributing system will comprise about 11,000 feet of 4-inch and 6-inch cast iron pipe which will provide extension of the system to all portions of the village. The distributing reservoir will be a circular reenforced concrete basin covered with a concrete roof surfaced with a 9-inch layer of earth. The reservoir is 36 feet in diameter and 8 feet in depth to the flow line. Its capacity is, therefore, 60,000 gallons, which provides for two days' storage. The reservoir is at an average elevation of 190 feet above the village and will, therefore, furnish good pressure on the mains. The reservoir may be cleaned by flushing through a fire hydrant located on the 6-inch connection with the distributing system.

SUMMARY.

In April, 1912, the State Board of Health approved a proposed site for public water supply wells at Baltic. A test well installed at this site indicates that the quantity and quality of the supply are satisfactory. Plans for the development of the water supply, received October 3, 1913, contain no features which may contribute to a deterioration in the quality of the supply.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the plans for a proposed water supply for Baltic, received October 3, 1913, from Mr. Seth Gerber, subject to the following conditions:

1st. That the village council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, to prevent the establishment of any privy vault, cesspool, or other source of pollution of the supply within 500 feet of the public water supply wells; and,

2nd. That this approval shall be void unless the proposed water supply shall have been installed prior to January 1, 1915.

EXAMINATION OF WATER FROM BALTIC

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
	1913									
12628	June 11	0	13.	slight	none	.27	.024	.846	.001	0
12627	June 11	0	13.	slight	none	.36	.028	.966	.001	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
12627	6.	241.	none	312.	33.	1.1	4,500	Neg. 10 c. c.
12628	6.	246.	none	315.	39.	1.3	6,480	Neg. 10 c. c.

Source of Samples.

12627 — Well.
12628 — Drilled Well.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR BARBERTON.

On November 20, 1913, plans for a proposed additional water supply for Barberton were received from Mr. Elmer E. Boden, city solicitor. Prior to the submission of the plans, on October 15, 1913, one of the assistant engineers visited Barberton and investigated the proposed additional water supply. After an examination of the plans the following report was submitted:

Barberton, a city with a population of 11,000, is located in Summit County about seven miles southwest of the city of Akron. The Tuscarawas River and Ohio Canal flow in a southerly direction immediately east of the city and Wolf Creek, a tributary of the Tuscarawas River, flows through the westerly portion of the city. Barberton is a rapidly growing manufacturing center, the principal products being matches, sewer pipe, chemicals, paints, rubber goods and boilers. It is provided with a public water supply and a complete system of sewers constructed on the separate plan.

EXISTING WATER SUPPLY.

The present water supply of the city was installed in 1905 and is obtained from a group of wells located about one mile northeast of the city in the valley of Mud Run, a small tributary of the Tuscarawas River. At present the wells are satisfactorily situated as regards the proximity of habitations but owing to the purchase and development of the territory surrounding the wells to be used for building purposes it is likely that within a few years the wells will be subject to polluting influences. Recently the supply has been somewhat inadequate and it has been necessary to restrict the use of water. The quality of the existing supply has always been found satisfactory by the State Board of Health, and there is no reason to believe that the wells receive any serious pollution. The water supply delivered to the consumers, however, has at times been contaminated, due to the existence of connections with the various manufacturing plants, by means of which canal water may reach the distributing system. These connections have been installed to furnish fire protection to the industrial plants, the majority of which maintain independent water supplies, obtained from the canal. The connections are provided with check valves, designed to prevent the canal water from reaching the city mains. A greater safeguard would be secured by the use of gate valves in duplicate.

PROPOSED ADDITIONAL WATER SUPPLY.

Due to the shortage of the existing supply and the likelihood of future encroachment upon the wells steps were taken by the city authorities in 1912 to secure an additional water supply. At that time a site in the valley of Wolf Creek in the extreme northwesterly portion of the city was contemplated. The actual development of this supply was delayed and it is now necessary to take immediate steps to increase the present supply. The general plans received November 20, 1913, provide for the installation of an additional water supply to be derived from wells in the valley of Wolf Creek near the northerly and westerly corporation limits of the city. Ultimately it is expected to obtain the entire supply for the city from wells in this locality and to abandon the existing supply.

Site. The location proposed for the additional supply wells is a tract of land having an area of 37.19 acres, 14.73 acres of which are west of the westerly corporation line of the city. The northerly limits of the site border the State Road and are about 400 feet south of the northerly corporation line of the city. The westerly and southerly boundaries are Carter Avenue and Brady Avenue, respectively, both of which may ultimately become utilized for residential purposes. Wolf Creek flows in a southerly direction at an average distance of 285 feet east of the site. At the present time there are seven dwellings located within 300 feet of the proposed site. The nearest dwelling is 300 feet from one of the proposed additional wells. It will be necessary to properly regulate the disposal of wastes at these dwellings to prevent possible contamination of the supply. The likelihood of future growth in the immediate vicinity of the site is somewhat remote due to the marshy character of the ground bordering Wolf Creek. It is possible, however, that the higher land lying west, northwest and southwest of the site will be used for building purposes. The elevation of the proposed location is below extreme high water of Wolf Creek and unless proper protection is provided portions of the site will be flooded to depths of five feet or more.

Wells. No complete plans for development of the entire site have been prepared. Later it is contemplated to provide an extensive well development which will utilize the site completely. Immediately, it is proposed to obtain an additional supply from two wells installed near the southerly boundary of the site. These wells are each 8 inches in diameter, 56 and 43 feet deep, respectively, and located 139 feet apart. The wells penetrated the following formations:

TEST WELL No. 1.

Material Penetrated.	*Thickness.*	*Total Depth.*
Black muck	3 ft.	3 ft.
White clay	14 ft.	17 ft.
Gravel	3 ft.	20 ft.
Brown sand	7 ft.	27 ft.
Gravel	7 ft.	34 ft.
Gray sand	6 ft.	40 ft.
Gravel	16 ft.	56 ft.

TEST WELL No. 2.

Material Penetrated.	*Thickness.*	*Total Depth.*
Black muck	3 ft.	3 ft.
Clay	4 ft.	7 ft.
Gravel	36 ft.	43 ft.
Sand	19 ft.	62 ft.
Quicksand	...	...

Casing pulled to 43 feet and strainer put in.

The water supply was obtained from the gravel and sand strata underlying the clay and rises under slight artesian pressure to an elevation about five feet below the surface. The wells are each cased to a point 10 feet from the bottom, the remaining depth being occupied by a strainer.

The quantity of water obtainable was demonstrated by a test of 10 days' duration, pumping ten hours each day, which indicated a yield per well of 150 gallons per minute. A maximum yield of 450 gallons for well No. 1 and 300 gallons for well No. 2 were obtained. As a result of this pumping test the ground water level was reduced slightly, indicating an abundant supply.

Quality of Water. The quality of the proposed additional supply is demonstrated by the examination of samples collected December 3, 1912, and October 15, 1913. The former sample as well as certain of the latter ones were taken from wells supplying manufacturing establishments located in the valley of Wolf Creek. The analyses indicate that the water obtained from the gravel deposits is of good quality from a sanitary standpoint and no evidence of dangerous organic contamination is shown. The hardness of the water is somewhat greater than that of the existing water supply but is not excessive for a ground water. The iron content is higher than is desirable but is probably not sufficient to cause serious complaint.

Water Works Development. The two driven wells proposed as an additional supply will be pumped by the use of double acting deep well pumps driven by electric motors and placed directly over the wells. The pumps will each have a capacity of 180 gallons per minute, which is less than the indicated capacity of the wells. The discharge of the pumps will enter a temporary 6-inch main connecting with the distributing system in the northwesterly portion of the city. The tops of the wells should extend above high water elevation of Wolf Creek.

SUMMARY.

The existing water supply of Barberton is not adequate for the needs of the city and it is proposed to acquire a tract of land for the immediate development of an additional water supply and the ultimate development of the entire supply for the city. The site is well located, although proper precautions must be taken in its immediate vicinity. The quality of the water obtained is satisfactory and the plans for development of the additional supply contain no improper features. Provision should be made requiring the city to submit full detail plans for ultimate development of the entire site.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the proposed additional water supply for Barberton to be obtained from two tubular wells, as shown on plans received November 20, 1913, from Mr. Elmer E. Boden, city solicitor, subject to the following conditions:

1st. That the well casings be extended to elevation 100 as shown on the plans submitted;

2nd. That the city council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, providing for the abandonment, cleaning, disinfection and filling of all leaching privy vaults within 500 feet of the proposed site for public supply wells; preventing the future establishment of any leaching privy vault or cesspool within that distance;

3rd. That no building other than for water works purposes shall be erected upon the proposed site;

4th. That all existing and future connections with industrial or manufacturing establishments, whereby polluted water may enter the distributing system, shall be provided with duplicate gate valves to be opened only for the purpose of supply water to such establishments; and,

5th. That this approval shall be void unless the proposed additional water supply shall have been installed in accordance with the foregoing conditions prior to June 1, 1914.

The Board also approved the site bounded by the State Road, Carter Avenue, Brady Avenue and Wolf Creek, as shown on a plan received November 20, 1913, from Mr. Elmer E. Boden, city solicitor, as a location for a new water supply for Barberton subject to the condition "That full detail plans for the complete development of the proposed site shall be submitted to the State Board of Health prior to June 1, 1914."

EXAMINATION OF WATER FROM BARBERTON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
11969	1912 Dec. 3	5.	3.	trace	none	0.0	.010	.046	0	0
13632	1913 Oct. 15	none	none	trace	none	.15	.004	.034	.001	.3
13633	Oct. 15	......	......	......						
11968	1912 Dec. 3	3.	2.	trace	none	.05	.020	.032	0	2.2
13631	1913 Oct. 15	none	none	none	none	.15	.004	.006	.001	.2
13629	Oct. 15	none	none	trace	keros.	.2	.004	.002	0	.2
13630	Oct. 15	none	none	trace	none	.1	.008	.012	0	.2

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria.	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
11969	6.8	161.4	45.5	275.	46.	.6	13	Neg. 10 c. c.
12632	6.5	157.	45	257.	47.	0.6	10	Neg. 10 c. c.
13633	......	....	......	......	......	......	1	Neg. 10 c. c.
·11968	19.3	157.6	93.5	392.	65.	.3	120	Neg. 10 c. c.
12631	15.	204.	62.5	378.	105.	0.6	......	
13629	5.8	192.	40.	276	59	0.7	10	Neg. 10 c. c.
13630	6.	197.	40.	309	83.	0.8	5	Neg. 10 c. c

Source of Samples.

11969 — Existing Water Supply. Pump Station.
13632 — Existing Water Supply. Pump Station.
13633 — Existing Water Supply. Distribution System.
11968 — Well at Rubber Product Plant Co.
13631 — Well at Columbia Chemical Co.
13629 — Proposed Well No. 2.
13630 — Proposed Well No. 1.

REPORT ON PROPOSED WATER SUPPLY FOR CENTERBURG

On May 31, 1913, plans and specifications for a proposed water supply for Centerburg were received from Mr. H. L. Maddocks, consulting engineer for the village. On the same date a request for approval of the plans was received from Mr. A. W. Brown, village clerk. The plans were referred to the engineering department and the following report was submitted:

Centerburg, a village with a population of 750, is located in Knox County near the head waters of the north branch of the Licking River. The drainage from the village is in a southerly direction to the stream which flows along the easterly corporation line.

PREVIOUS ACTIONS OF THE STATE BOARD OF HEALTH.

The question of the proposed water supply of Centerburg was first brought to the attention of the State Board of Health in 1911. In March of that year a representative of the engineering department visited Centerburg and examined proposed locations for public water supply wells. The village authorities were advised that a site located a few hundred feet east of the village and north of Main street extended was satisfactory. In March and May 1912 a representative of the engineering department visited Centerburg with reference to the examination of the test well installed at the site informally approved. At this time a well had been drilled 600 feet deep with a casing extending to a depth of 300 feet. An inadequate quantity of water was encountered at this depth and the water was found to be of unsatisfactory mineral characteristics. The village was advised of the results of these investigations and the more recent attempts have been confined to securing a water from shallower wells.

PROPOSED WATER SUPPLY.

The plans of the consulting engineer provide for the installation of a water supply to be obtained from wells on a site located a short distance east of the village from which the water will be pumped into the distribution system directly. The elevated tank for storage and equalization of pressure is to be installed.

Site. The village has purchased a tract of land 150 by 50 feet located immediately south of the Cleveland, Akron and Columbus Railroad right of way, east of Sparta Road, and north of Main Street extended. This location is 600 feet east of the north branch of the Licking River which is the easterly corporation line of the village. There are two dwellings within 500 feet of the site, the drainage from both of which is away from the site. It is not probable that future building operations will be active in the vicinity of the proposed site, and its elevation is such as to preclude the danger of contamination due to surface drainage.

Wells. It is proposed to obtain a supply from two or more wells drilled to a depth of approximately 115 feet. One of the wells already installed penetrated the following formations:

Surface clay	20 feet
Hard blue clay	80 feet
Fine sand grading to coarse sand	15 feet

The water is derived from the sand formations and rises to an elevation 60 feet below the surface. The casing of the well extends to a depth of 105 feet and is provided with a length of perforated pipe to provide entrance of the water. Brass strainers will be used for the permanent installation. The wells are to be placed 200 feet apart which will probably be sufficient to avoid interference during pumping.

Quantity of Water. A pumping test to determine the quantity of water was carried on during a period of 72 hours with a yield of 90 gallons per minute. No observations were made to determine the effect upon the ground water level and it is possible that more extensive pumping at this rate may result in the failure of the well. Previous investigations have indicated the necessity of thorough tests to determine the available quantity.

Quality of Water. Samples from the existing test well were collected May 14 and May 21, 1913. The first sample had an objectionable bacterial content and the water was somewhat turbid. The mineral characteristics of the water were objectionable in that an abnormal iron content was found. The hardness of the water consisted entirely of carbonates. The samples collected May 21st, were more favorable as they showed a lower bacterial content. The iron had also reduced to a large extent. The bacterial content of the first sample was probably due to the newness of the well and the inadequacy of the pumping equipment. It is probable that with continued pumping the bacterial content will be satisfactory. The iron content will impart objectionable physical characteristics to the water and is present to such an extent as to require the installation of a plant for its removal.

Pumping Equipment. The wells will be pumped by deep well power pumps placed over each well. The pumps will be driven by gas engines and it will be possible to pump either or both wells as is required. The pumps will have a capacity of 100 gallons per minute each and will be housed in small brick structures.

Distribution System. The distribution system will consist of 6-inch and 8-inch cast iron pipe and will cover practically the entire built up area of the village. Only two dead ends are shown in the design which is especially adapted for good circulation through the mains. The total length of the mains will be 16,550 feet of which 84.6 per cent will be 6-inch pipe.

Elevated Tank. For storage and equalization of pressure it is proposed to construct a steel tank 20 feet in diameter by 25 feet 3 inches high elevated upon a tower 125 feet above the surface of the ground. The tank will be covered with a conical steel roof. Its capacity will be 75,000 gallons, approximately one day's supply. The tank will be placed adjacent to the wells on the water works property.

SUMMARY.

It is proposed by the village of Centerburg to install a water supply to be obtained from wells located at the site east of the village, satisfactorily situated as regards the probability of contamination. The tests of the supply have shown that the water is safe for domestic use, although it contains an abnormal iron content. The tests for quantity have not conclusively demonstrated that the supply is adequate. The plans for the development of the supply are satisfactory and contain no features which may contribute to the deterioration of the water.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the proposed water supply for Centerburg, to be developed according to plans received from Mr. H. L. Maddocks, consulting engineer for the village, May 31, 1913, was approved subject to the following conditions:

1st. That a deferrization plant shall be installed to remove the iron from the water before it is pumped into the mains;

2nd. That the village council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, prohibiting the establishment or maintenance of any leaching privy vault or cesspool or other possible source of pollution of the water supply within 500 feet of any of the wells;

3rd. That an additional area of at least three-fourths acre contiguous to, and south of the present property be acquired for water works purposes; and,

4th. That this approval shall be void unless detailed plans for a deferrization plant shall have been submitted prior to September 1, 1913, and the proposed water supply shall have been installed prior to September 1, 1914.

The village officials and their consulting engineer were advised to arrange for extensive pumping tests as a first step in the installation of the proposed supply; previous investigations by the State Board of Health having indicated the danger of inadequacy of a ground water supply at Centerburg, the question should be determined before the water works equipment as a whole shall have been installed.

REPORT ON PROPOSED WATER SUPPLY FOR COLONIAL HEIGHTS, AKRON.

On August 27, 1913, plans for a proposed water supply for The Colonial Home Builders Company's allotment at Akron, known at Colonial Heights, were received from Mr. J. W. Payne, consulting engineer for the realty company. The plans were accompanied by a city ordinance granting permission for the proposed improvement and a communication from the secretary of The Colonial Home Builders Company requesting formal approval. On August 20, 1913, a preliminary examination of the site for a proposed supply well for the allotment was made by the principal assistant engineer. Based upon this inspection and a review of the plans the following report was submitted:

The Colonial Home Builders Company of Akron, of which Mr. Joseph G. Engelman is secretary, has laid out an allotment located in the extreme eastern portion of the city. The allotment has been divided into 233 lots and is located approximately 90 feet above the surrounding territory.

The realty company made application to the city of Akron to extend its water supply mains in order that this allotment might be accommodated. It was impossible for the city at this time to extend its distributing system, owing to the fact that other and more needed extensions had preference. It should be noted that a booster pumping station will be required when the allotment becomes tributary to the city distributing system.

The question of temporarily supplying the allotment was taken up by the realty company with the city officials. An agreement was reached which enabled the realty company to immediately install a distributing system and provide a supply of water in order to meet present demands. This agreement is expressed in a city ordinance No. 3884 and makes provision for the city taking over the distributing system, which will be installed by the realty company. The company has also made provision for installing sewers which will connect with the city sewers in this district, permission having been granted by a resolution of the city council passed March 24, 1913. Plans for the water distributing system have been accepted by the director of public service of Akron and have been so designed as to ultimately connect with the city mains.

The Colonial Home Builders Allotment is contemplating furnishing the Central Allotment, an adjoining realty addition, with water. The Central Allotment comprises 136 lots, none of which have at present been built upon. The realty company has constructed quite a number of houses on the Colonial Heights Allotment, although only about six of them are at present occupied. It has been roughly estimated that the ultimate population of both the Colonial Heights aand Central Allotments will not exceed 1,000. However, it is thought that it will be a number of years before this district will be completely built up.

In order to provide residents with water and incidentally fire protection until such a time as the city will supply this utility, the realty company has installed a proposed public supply well. This well is located, on lot No. 170 between Hudson and Elvon Avenues, upon the crest of the hill on which the allotment is situated. The well is 8 inches in diameter and has been drilled to a depth of 263 feet. The formations penetrated consist of 12 feet of top soil and clay, while the remainder of the depth is sandstone. The well is cased with 8-inch casing extending to the sandstone. The normal water level in the well is 183 feet below the surface of the ground. No adequate pumping test has been made although it is the belief of the consulting engineer that an ample supply of water is available.

The well is in rather close proximity to a number of residences and it will be necessary to provide strict sanitary control for these premises. The nearest habitation is 350 feet to the south while there are three dwellings within a radius of 600 feet. The geological formations of the location are such as to preclude the probability of contamination through underground sources.

On November 12, 1913, the well was pumped and a sample of water collected by the consulting engineer and shipped to the laboratory of the State Board of Health for analysis. The analytical results of this sample show that the water was of satisfactory quality from a sanitary standpoint at the time of sampling. Its physical and chemical properties are very good and the bacterial content is not above the average for a deep well water. It should be noted that no data have been submitted by the consulting engineer, relative to the quantity of water available, as indicated by the pumping test. The discharge from the well at the time of the collection of the sample was not known.

The plans submitted by the consulting engineer do not show the method for handling the water. It was understood, however, that a deep well pump would be installed. The water will be discharged from the well to an elevated wooden storage and distributing tank located directly over the well. This tank, which will have a capacity of 20,000 gallons, is of such elevation as to supply a minimum pressure of 20 pounds on the distributing system.

The distributing system, which has been approved by the city of Akron, comprises 1.5 miles of cast iron mains, 4, 6, and 8 inches in diameter. The circulation through the distributing system is extremely bad as there are eight dead ends. This feature will probably be improved in the future when the city extends its lines to take in the allotment. Eleven fire hydrants will be installed to afford fire protection.

SUMMARY.

Briefly summarizing the Colonial Heights and Central Allotments, located in the extreme easterly portion of the city of Akron, are at present without water supply facilities. Although the city expects to ultimately accommodate these districts, more urgent extensions will be given attention first. In order to avoid delay, and supply the present urgent demand for a water supply for domestic service and fire protection, the realty company proposes installing a public supply well and distributing system. The distributing system has been accepted by the city of Akron and will form a part of the city's future water distributing system extensions. The supply is to be obtained from a drilled well located near the center of the allotment and it is thought that this well will not be in service more than two or three years. The location of the well is not all that is to be desired owing to the fact that the immediately surrounding territory is likely to become rather thickly settled within a few years, at which time there is danger of contamination from the subsoil affecting the supply. Analyses of the water showed it to be of satisfactory quality at the time of sampling. It is doubtful, however, if an adequate supply will be available. However, this depends much upon the consumption which is at this time rather difficult to estimate. The method of handling the supply has not been shown on the plans, although from previous correspondence and interviews, some knowledge of the development was gained. It is thought that the method of handling the water is of little significance from the standpoint of efficiency, as the entire equipment, excluding the distributing system, is looked upon as temporary.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the plans for a proposed water supply for Colonial Heights, Akron, an allotment of The Colonial Home Builders Company, received from Mr. J. W. Payne, consulting engineer, August 27, 1913, subject to the following conditions:

1st. That within a radius of 500 feet from the proposed supply well all dwellings shall be provided with sewer connections, no privy vaults or cesspools shall be established, and all sewers shall be constructed with watertight joints;

2nd. That the proposed supply shall be abandoned as soon as connection with the water distributing system of the city of Akron is made possible; and,

3rd. That this approval shall be void unless the proposed supply shall have been installed prior to June 1, 1914.

EXAMINATION OF WATER FROM AKRON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
13784	1913 Nov. 12	none	none	v. sli.	none	.25	.016	.194	.001	.2

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
13784	5	173	none	190	23	.5	210	Neg. 10 cc.

Source of Sample.

13784 — From well 183 feet deep. Sample collected by Mr. J. W. Payne, consulting engineer.

REPORT ON WATER PURIFICATION PLANT AT CONNEAUT.

On April 11, 1912, the State Board of Health withheld approval of plans for enlargement of the water purification plant at Conneaut, until such time as detailed plans for loss of head gages, rate controllers and devices for measuring the amount of water filtered, and samples of sand to be used in the filters had been submitted and received the approval of the engineer of the State Board of Health. On December 18, 1912, the principal assistant engineer examined the water purification plant at Conneaut and found that in spite of the Board's action the plans had been carried out as originally submitted. The following report was submitted:

Conneaut is a city with a population of about 8,300, located in Ashtabula County on Lake Erie at the mouth of Conneaut Creek. The water works were installed in 1899 by The Conneaut Water Company, which company still operates the works. In 1900 a filter plant with a capacity of 500,000 gallons was installed. In 1904 the plant was enlarged, and in 1912 further steps were taken to again enlarge the plant. In February, 1912, in connection with an examination of the plant, it was learned that construction of additional filters and a clear well was in progress. Plans had not been submitted to the State Board of Health for approval. However, in March, 1912, at the request of the engineer of the Board, plans were submitted by Messrs. Burgess and Long, consulting engineers for The Conneaut Water Company. These plans were deficient in that they did not include loss of head gages, rate controllers, devices for measuring the amount of water filtered, and adequate storage capacity for filtered water. In April, 1912, the Board withheld approval of the plans as submitted and required that revised plans incorporating the neglected features be submitted.

The inspection of December 18, 1912, revealed the fact that regardless of the Board's action, the company had completed and placed in operation the additional filters without providing the accessories required. This action of The Conneaut Water Company, although in direct violation of the law, was probably prompted by the necessity of immediately securing enlarged capacity of the plant. At the time of the examination of the plant, December 18, 1912, a water of satisfactory quality was being delivered. The raw water from the lake, while of rather good quality at the time of sampling, is subject to considerable fluctuation, owing to the proximity of the mouth of Conneaut Creek. At certain times, therefore, the quality of the raw water is very poor, and unless every precaution is taken to provide proper operation of the water purification plant, the filtered water cannot be expected to be uniformly satisfactory. The installation of loss of head gages, rate controllers, and measuring devices is immediately necessary, and as the pumpage increases, enlarged clear well capacity will be required.

ACTION OF THE BOARD.

At a meeting held February 20, 1913, the Board considered this report and voted to require The Conneaut Water Company to immediately submit revised plans for the enlargement of the water purification plant made during the early part of 1912, which plans should incorporate loss of head gages, rate controllers, and measuring devices for the filters; and that in the event of the failure of the company to submit such revised plans prior to April 15, 1913, to refer the matter to the Attorney General for legal action against the said company.

The Conneaut Water Company was advised that these accessories were necessary to secure uniformity in the operation of the filters, and that even with the recent enlargement, the clear well capacity represented only a small period of storage, which, with increasing pumpage, would be inadequate to make regular rate of operation of the filters possible.

REPORT ON ENLARGEMENT OF WATER PURIFICATION PLANT AT CONNEAUT.

In April 1912 the State Board of Health considered a plan for the enlargement of the water purification plant at Conneaut, submitted March 21, 1913, by Messrs. Burgess and Long, consulting engineers. The Board withheld its approval of the plan because the design did not include loss of head gages, rate controllers, and devices for measuring the amount of water filtered.

Following this action of the Board, The Conneaut Water Company proceeded to install the enlargement without providing the necessary controlling apparatus. In February 1913 the Board considered this violation of Section 1240 of the General Code and informed the company that the Board would require that the devices be installed.

On April 21, 1913, plans for proposed loss of head gages, rate controllers, and measuring devices were received from Mr. Lee Harvey, superintendent of The Conneaut Water Company. These plans were referred to the engineering department and the following report was submitted:

The water purification plant previous to the recent enlargement comprises an intake from Lake Erie, a settling basin with a capacity of 79,000 gallons, filters of the rapid sand type with a capacity of 1.5 million gallons, and a clear well with a capacity of 7,000 gallons. The average water consumption is approximately 1.2 million gallons, and the maximum daily consumption is 2 million gallons. The necessity of an enlargement is apparent.

The plans for the enlargement of the plant were discussed in detail in a report dated March 29, 1912. Briefly, the plans provide for the addition of three units of rapid sand filters with a capacity of 1.35 million gallons per day, and a new clear well with a capacity of 50,000 gallons per day. As enlarged the plant has a nominal capacity of 2.85 million gallons per day.

The plans for controlling apparatus provide for the installation of loss of head gages, rate controllers, and indicating rate of flow gages of the type furnished by The Builders Iron Foundry, Providence, R. I. The loss of head and rate of flow gages will be placed on a stand at each filter and with proper operation will readily indicate action of the filter. The rate controllers are of the Venturi type which has been shown to be satisfactory.

With the installation of controlling apparatus a marked improvement in the operation of the water purification plant will result. However, an increase in the capacity of the clear well is to be desired as the present capacity represents only 30 minutes storage when the plant is operated at its nominal capacity. A standpipe with a capacity of 247,000 gallons provides additional storage of filtered water but this cannot be depended upon to furnish an available supply for fire protection. The clear well capacity should be increased to represent at least three hours storage based upon the nominal capacity of the plant.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the plan for the enlargement of the water purification plant of The Conneaut Water Company at Conneaut, submitted by Messrs. Burgess and Long, consulting engineers, March 21, 1913, and plans for controlling apparatus submitted by Mr. Lee Harvey, superintendent of The Conneaut Water Company, April 21, 1913, were approved subject to the following conditions:

1st. That additional clear well capacity be installed when deemed necessary by the State Board of Health;

2nd. That accurate records of the operation of the plant be maintained and furnished to the State Board of Health at monthly intervals; and,

3rd. That this approval shall be void unless the proposed loss of head gages and rate controlling and indicating apparatus shall have been installed prior to August 1, 1913.

The Conneaut Water Company was advised that the clear well capacity represented only a small period of storage and that with high rates of pumping was inadequate to make possible a constant rate of operation of the filters.

REPORT ON PROPOSED NEW WATER SUPPLY FOR FRANKFORT.

On June 17, 1913, plans for a proposed new water supply for Frankfort, prepared by The W. J. Sherman Company of Toledo, consulting engineers, were received from Mr. J. J. Bell, village clerk. On March 17, 1913, prior to the submission of the plans, the principal assistant engineer visited Frankfort and investigated the proposed water supply improvements. After the plans had been examined in the engineering department the following report was submitted:

Frankfort is a village with a population of about 750, located in Ross County on the north fork of Paint Creek. The village is a farming community having no manufacturing establishments. In the way of municipal improvements the village is provided with a municipally owned electric lighting plant and a privately owned water works system. The topography of the locality is rolling. The village is situated upon elevated ground north of Paint Creek which receives the drainage directly from the southerly portion of the village. The northerly portion of the village is drained by Old Town Run, which is tributary to the Creek a short distance east of Frankfort. The drift deposits in the vicinity of Frankfort are of glacial origin and consist of clays and gravel. Throughout the village and in the broad level valley of Paint Creek are rather extensive gravel deposits which are abundantly water bearing. These deposits are immediately underlaid by limestone formations. Most of the private wells obtain their water from the drift deposits, although there are several drilled wells which penetrate the limestone formations and obtain sufficient water from this source.

EXISTING WATER SUPPLY.

The first water supply of Frankfort was installed in 1905 when Mr. O. M. Junk, of Chillicothe, placed in operation a water works system for fire protection purposes. This supply is said to have been poorly installed and operated and the entire equipment was abandoned about one year ago. The supply was obtained from driven wells about 80 feet deep penetrating the gravel formations overlying the limestone. The wells were located within the built-up portion of the village. It is claimed locally that the water was satisfactory for general use. The equipment of the system comprises a small pumping station, about 1.6 miles of 3 and 4-inch cast iron mains, and an elevated tank of wooden construction. At the present time the equipment is in a poor state of repair.

PROPOSED NEW WATER SUPPLY.

Primarily to provide fire protection for the village, but also to supply water satisfactory for general use, the village proposes to install a new municipal water supply. The plans for the development of the supply contemplate the installation of a drilled well in the valley of the north fork of Paint Creek immediately south of the village. A pumping station, a new distribution system, and an elevated tank will also be installed. A bond issue of $12,000 has been provided for the installation of a new supply and it will be seen that the strictest economy must be practiced.

Source of Supply. The site upon which it is proposed to place the public supply well is a tract of land with an area of 0.5 acre, owned by the village, located between the right of way of the Cincinnati, Hamilton and Dayton Railroad and the north fork of Paint Creek, immediately west of Main Street extended. The property is at present occupied by the municipal lighting plant. Within 600 feet of the site are several dwellings located in the extreme southerly portion of the village and owing to the proximity of these sources of pollution the village officials have been advised by the State Board of Health to avoid the development of a shallow ground water supply at this site. Plans unofficially submitted by the consulting engineers, May 12, 1913, provided for the development of a shallow ground water supply by means of a dug well located south of Paint Creek about 700 feet from the pumping station. These plans were, however, rejected by the local council before they were reported upon to the State Board of Health. As a location for the installation of a deep drilled well penetrating the limestone formations underlying the gravel deposits of the creek valley the proposed site is satisfactory. It is probable that future building operations in the vicinity of the site will be unimportant.

Wells. It is probable that wells installed at the proposed site will penetrate about 40 feet of gravel at which point limestone formations will be encountered. A private well which obtains its supply from the limestone at a point near the proposed site has a depth of 127 feet. The casing of the public supply wells will be extended into the limestone formations to exclude all water from the gravel deposits.

Quantity of Water. No tests have been made to determine the quantity of water available from the limestone formations. Two private wells within the village obtaining water from this source, are said to have an abundant yield. Subsequent to the drilling of a well on the water works property a test should be conducted to determine the availability of the quantity of the water.

Quality of Water. The quality of water available from the limestone formations is indicated by the analyses of a private well 127 feet deep obtaining its supply from these formations. The water is of satisfactory quality from a sanitary standpoint but is excessively hard and contains a rather high iron content. The iron imparts a turbidity to the water. It is probable that continued pumping may bring about a reduction of the iron but the hardness will continue as an objectionable feature.

Water Works Equipment. The pumping station will comprise an addition to the existing municipal lighting plant with which it will be jointly operated. It is proposed to install a steam pump with a capacity of 500 gallons per minute. To permit intermittency of pumping an elevated tank 100 feet in height with a capacity of 60,000 gallons will be provided. The distribution system will include cast iron mains ranging in size from 4 inches to 8 inches in diameter with a total length of 1.5 miles.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, a proposed new water supply for Frankfort, to be obtained from drilled wells on the property owned by the village, located between the Cincinnati, Hamilton and Dayton Railroad and the north fork of Paint Creek, and to be developed according to plans of The W. J. Sherman Company, Toledo, consulting engineers, submitted June 17, 1913, were approved subject to the following conditions:

1st. That the wells shall be cased through the gravel deposits and obtain their entire supply from the underlying rock formations;

2nd. That the quality of the proposed supply, as demonstrated by samples collected subsequent to an adequate pumping test, shall be satisfactory to the State Board of Health;

3rd. That the village council shall pass an ordinance, satisfactory to the State Board of Health, to prevent the establishment or maintenance of any leaching privy vault, cesspool, or other possible source of contamination of the water supply within 500 feet of the public supply wells; and,

4th. That this approval shall be void unless the proposed water supply shall have been installed prior to July 1, 1914.

REPORT ON PROPOSED IMPROVEMENT OF WATER SUPPLY AT GENEVA.

On June 6, 1913, plans and specifications for a proposed improvement of the water supply at Geneva, comprising the construction of a new storage dam, were received from Messrs. Burgess and Long, consulting engineers for the village. On June 17, 1913, the principal assistant engineer visited Geneva and investigated the proposed improvement. The following report was submitted:

Geneva, a village with a population of 2,500, is located in Ashtabula County on Cowles Creek, about 10 miles from Lake Erie. The village is provided with a water supply, purified by a plant of the rapid sand type, a system of sewers constructed on the separate plan, and a sewage treatment plant.

The water supply of the village was installed in 1902, the supply being obtained from the Grand River at a point about three miles south of the village. A low dam was installed to impound the flow of the river sufficiently to insure a permanent supply and to provide for the operation of a water turbine to drive the pumps. The dam which has served up to the present time is a timber structure 250 feet in length and 6 feet in height. The dam has deteriorated to such an extent that it fails to impound the flow of the stream sufficiently to divert it to the head race for power development. In addition it has been practically destroyed by several serious floods.

The water purification plant, which was installed in 1902, comprises a coagulating basin, a rapid sand filter, and clear well. The nominal capacity of the plant is 600,000 gallons. The average daily consumption of water is approximately 250,000 gallons.

Proposed New Dam. In order to impound a more abundant supply of water to furnish an adequate quantity during the low flow of the stream, it is proposed to install a new dam which will raise the elevation of the river to practically the same point which obtained before the failure of the present dam. The design provides for a dam 325 feet in length and 8 feet in height above the bed of the river. The entire length of the dam will serve as a spillway and side walls are provided to increase the spillway capacity. The design provides a hollow, reinforced concrete section strengthened by buttresses placed within the dam at intervals of 25 feet. The design of the dam appears to be liberal and to afford a considerable factor of safety.

The intake for the raw water will be located at the south end of the dam where the depth of the water will be approximately 6 feet. The water will be conveyed to the water purification plant by gravity, discharging into a low lift suction well. The consulting engineers have not submitted data relative to the reservoir which will be formed by the proposed new dam. It is stated, however, that it will cover the same area and have the same depth as the original reservoir as formed by the construction of the dam in 1902. The watershed area of the Grand River above the proposed dam is 325 square miles and its minimum dry weather flow is amply sufficient to supply the water required by the village of Geneva. The storage of the flow of the Grand River is for the purpose of providing water power development rather than for conserving a supply during dry weather. Due to the fact that the low flow of the stream will cause a current through the reservoir at all times, it is not likely that trouble will be experienced from excessive growths of micro-organisms. The watershed of the Grand River is one of the cleanest in Ohio. The population is less than 20 per square mile and there are no communities on the watershed with populations greater than 500. The supply is, therefore, not seriously polluted and large reservoir storage is not required as an adjunct to its purification. The various examinations of the Geneva water purification plant have indicated that it is capable of producing a well purified effluent at all times.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, the proposed improvement in the water supply of Geneva, consisting of the construction of a new storage dam, according to plans and specifications received from Messrs. Burgess and Long, consulting engineers, June 6, 1913, was approved subject to the following conditions:

1st. That the reservoir shall be cleaned and stripped of organic growths when deemed necessary by the State Board of Health; and,

2nd. That this approval shall be void unless the proposed dam shall have been installed prior to June 1, 1914.

The Board advised that in order to facilitate future cleaning of the reservoir, provision be made in the design for drawing off the contents of the reservoir to low water elevation of the stream.

REPORT ON PLANS FOR THE DEVELOPMENT OF PROPOSED NEW WATER SUPPLY FOR GLOUSTER.

On March 10, 1913, detailed plans for the development of a proposed new water supply for Glouster were submitted by Mr. A. Elliott Kimberly, consulting engineer for the village. Plans were referred to the engineering department and the following report submitted:

Glouster is a village with a population of 2527 in 1910. It is located in Athens County at the confluence of Sunday Creek with the west branch of that stream. The present water supply is obtained from the west branch of Sunday Creek direct, from a dug well in the valley of the stream, and from the drainage from a coal mine. The supply is entirely unsatisfactory in quality and is inadequate to supply the village. The west branch of Sunday Creek contains considerable mine wastes sufficient to make the water acid at low stages. The turbidity is excessive following rainfall.

In October, 1912, the State Board of Health approved a proposed new water supply for the village to be obtained from drilled wells located in the extreme northeasterly portion of the village between the Kanawha and Michigan Railroad and Sunday Creek. The approval of the Board contained the following conditions:

> "1st. That prior to the installation of the supply exhaustive tests be made to demonstrate the available quantity, and that the results be submitted to the State Board of Health;
>
> "2nd. That detailed plans of the development of the supply be prepared and submitted to the State Board of Health for approval;
>
> "3rd. That a plant for the removal of the iron content be incorporated in the design and be installed if future examinations of the State Board of Health shall demonstrate its necessity;
>
> "4th. That the village council by purchase or otherwise control all property within 500 feet of any well and prevent the establishment of any source of pollution within that distance; and
>
> "5th. That this approval shall be void unless detailed plans for the development of the supply and the results of tests for quantity, shall have been submitted to the State Board of Health prior to April 1st, 1913."

DETAILED PLANS FOR DEVELOPMENT OF SUPPLY.

Prior to the preparation of detailed plans for the development of the supply, the village contracted for the drilling of five wells at the site approved by the State Board of Health and for the equipment of the wells for pumping by air lift. The plans of the engineer, therefore, contain provision for collecting the water pumped from the wells and discharging it into the distribution system. In brief, the plans show the well piping, gravity conduit, collecting well, pumping station, and connection to the distribution system.

Wells. The wells, five in number, are located at an average distance of 600 feet apart on both sides of Sunday Creek. They extend to a depth of 80 feet, penetrating shallow clay and hardpan, with a total thickness of 38 feet and entering a waterbearing standstone from which the supply is obtained. Six-inch wrought iron casings extend to the bottoms of the wells. One-inch air lines and two-inch discharge lines extend to the bottoms of the wells within the casings. The tops of the casings will be closed by concrete plugs or by reamed caps. The discharge lines connect with a gravity conduit to convey the water to the pump well at the pumping station. In order to provide sufficient head for gravity flow a riser pipe from the discharge line will be carried to varying heights at each well. This riser will also serve as an air separator. It is proposed to pump the wells at a rate of 50 gallons per minute each. It should be noted that the available submergence is not over 50 per cent when the wells are pumped at this rate, which may introduce difficulties in pumping the wells. No exhaustive tests to demonstrate the available quantity of the proposed supply have been made as provided for in the approval of the Board.

Conduit. The collecting conduit to convey the water from the wells will be of 6-inch and 8-inch wood pipe. The total length of the line is about 3140 feet. It will be laid with a minimum cover of 4 feet and will cross Sunday Creek through an inverted siphon to be placed not less than 4 feet below the stream bottom. It is not probable that the water supply will become contaminated in the conduit.

Pump Well. The gravity conduit will discharge into a pump well of concrete and brick construction to be located near the pumping station. The well is 23 feet in diameter by 17 feet deep, providing an effective storage of 27,000 gallons. The well will be covered by a reinforced concrete roof. To protect the supply from contamination an overflow at an elevation 6 inches below the gravity conduit leads to an outlet at the surface of the ground near the plant. To prevent contamination reaching the supply by this means a gate valve will be placed in the overflow line.

Pumping Station. In installing a new water supply it is necessary to construct an entire new pumping station and it is proposed to incorporate in the same building an electric lighting plant. The present pumping equipment which will be utilized in the new station consists of two horizontal, compound, duplex pumps of 850,000 gallons capacity. They take their suction from the pump well two feet above the bottom. The pump discharge will be connected with the existing distribution reservoir through a line of 8-inch wood pipe to be installed. A valved connection through a 6-inch cast iron line to the present distribution system will also be provided.

Influence of Sunday Creek. Sunday Creek which flows near the site of the wells and pumping station at times reaches a stage sufficient to submerge the wells and pump well. It is necessary to guard against the pollution of the supply at such times. The capping or plugging of the well casings, the proper construction of the gravity conduit, and the water tightness of the pump well will avoid danger from this source.

Iron Removal. The plans of the consulting engineer do not incorporate details of a deferrization plant although the possibility of the future installation of such a plant is recognized in the design. The present financial condition of the village is such that it is impossible to install a plant for iron removal. Moreover, as expressed by the consulting engineer, it is probable that pumping of the wells may tend to reduce the iron content. To make possible the future installation of a deferrization plant ample space is provided near the pump well. The risers extending from the discharge lines may be lengthened sufficiently to increase the available head in the conduit. Hydraulic data relative to the provision of sufficient head to make possible the operation of a plant have been submitted by the consulting engineer.

ACTION OF THE BOARD.

At a meeting held March 20, 1913, the State Board of Health approved the plans for the development of a proposed water supply for Glouster, submitted by Mr. A. Elliot Kimberly, consulting engineer, March 10, 1913.

The village authorities and their consulting engineer were advised that in plugging or capping the well tops, installing the gravity conduit, and constructing the pump well, especial care should be taken to secure water tightness to avoid the danger of pollution of the supply, especially during high stages of Sunday Creek.

The village authorities were also informed that the availability of a water supply of adequate quantity and satisfactory mineral quality was not assured, inasmuch as no exhaustive tests of the quantity of the supply had been made, in accordance with the first condition of this Board's approval of a proposed water supply for Glouster granted October 23, 1912.

REPORT ON PROPOSED NEW WATER SUPPLY FOR GRANVILLE.

On July 16, 1913, a communication was received from Mr. C. D. Coons, secretary of the board of trustees of public affairs, Granville, requesting temporary approval of a proposed new water supply for the village. Prior to the receipt of this communication, on June 18, 1913, specifications for proposed water supply improvements were received. One of the assistant engineers visited Granville on June 21, 1913, and investigated the proposed new water supply. The following report was submitted:

Granville, a village with a population of about 1,400, is located in Licking County on Raccoon Creek, a tributary of the Licking River. The topography of the village and surrounding country is rather hilly and drainage from the principal portion of the village is in a southerly direction to Raccoon Creek. The locality is underlaid by sandstone which in the hills is covered by a thin capping of drift. In the valley the drift deposits have a thickness of 40 to 60 feet.

Aside from a public water supply the village has no municipal improvements. Plans for a comprehensive system of sewers and sewage treatment works were approved by the Board in August 1912, but these have not been installed. In the absence of sewerage facilities privy vaults and cesspools are in general use and contribute to the pollution of the sub-soil water. The location of the existing water supply is such that the wells obtaining their supply from the shallow gravel deposits are subject to the polluting influences mentioned.

Present Water Supply. The water supply installed in 1884 was obtained from three drilled wells penetrating the gravel deposits in the valley of Raccoon Creek in the southwesterly portion of the village. These wells were extended to a depth of 45 feet. Later a fourth well was drilled to a depth of 60 feet, obtaining its supply also from the gravel deposits.

During recent years the growth of the village has brought about an encroachment of habitations in the vicinity of the water supply wells, and the danger of pollution of the supply, therefore, exists. The quality of the water obtained from the wells is indicated by analyses made by the State Board of Health in 1903 and 1912. They indicate that a deterioration has taken place in the quality of the water obtained. With the installation of a new water supply the existing supply wells will be abandoned.

Proposed New Water Supply. In the early part of 1912 a well was drilled on the present water works property about 40 feet north of the old wells, extended to a depth of 400 feet, plugged at a depth of 175 feet, and securing water at a depth of 125 feet. This well was cased to a depth of 98 feet, obtaining its supply from a shaley sandstone underlying the gravel deposits. In January 1912, a verbal request for approval of this proposed additional supply was made by the mayor of the village. Subsequently the Board at a meeting held February 15, 1912, withheld its approval of the proposed additional supply and recommended that the village employ a competent engineer to make a study of the problem of additional water supply with a view to securing an entirely new supply. The village was also advised that the water from the shallow drilled wells was of uncertain quality and that this supply should be abandoned; also that the water from the proposed new well, while of satisfactory quality from a sanitary standpoint, contained mineral characteristics which would make the supply objectionable.

Recently the village has drilled a second well a short distance east of the well drilled in 1912, and it is now proposed to utilize these two wells as a temporary source of water supply for the village. The recently drilled well has a depth of 179 feet and is cased into the sandstone formation. The communication of the secretary of the board of trustees of public affairs requests permission to use the supply obtained from the drilled wells temporarily, pending a decision as to the location of a permanent source of water supply. It also requests permission to install improvements in the equipment of the water supply.

The quality of the proposed additional water supply is demonstrated by samples collected June 16, 1912, and June 21 and 24, 1913. The analyses indicate that the supply is of an entirely satisfactory quality from a sanitary standpoint and no evidences of serious organic contamination are shown. In its mineral characteristics, however, the water is not so satisfactory. The iron content is the principal objection, this constituent being present in an amount to cause the water to become turbid, corrode pipes and mains, and stain plumbing fixtures, etcetera. The hardness of the water is rather high, but principally consists of temporary hardness which will be removed by boiling. The quality of the water is entirely safe for drinking purposes but the use of the water as a permanent supply is not advisable due to its objectionable mineral characteristics.

The improvements in the equipment of the water works comprises the installation of a new boiler; an air compressor; a service pump; an elevated steel tank; and a new pumping station. These improvements are necessary immediately to provide adequate fire protection for the village; but it would be advisable to install the equipment with a view to moving it and abandoning the present location should it be found advisable to secure a new site for the supply wells.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, this proposed new water supply for Granville, to be obtained at a depth of 125 feet, from two drilled wells located on the site of the present supply wells, as outlined in a communication received July 16, 1913, from Mr. C. D. Coons, Secretary of the board of trustees of public affairs, was considered. Temporary approval was granted subject to the following conditions:

1st. That the village shall have a complete study of available sources of water supply made by an experienced engineer with a view to securing a permanent water supply of satisfactory quality;

2d. That all improvements to be made at the site of the existing and new wells, including the pumping station equipment shall be installed in a manner to permit of the economical transfer of the entire equipment to a new location should it be found advisable to secure a new site for the supply wells; and,

3d. That this approval shall be considered void unless the plans for a permanent water supply shall have been submitted to the State Board of Health for approval prior to July 1, 1914.

The attention of the authorities was called to the advice given by the State Board of Health in its action of February 15, 1912, which was as follows:

1st. That the present supply, installed in 1884, while originally of excellent quality, now shows evidence of remote contamination, and that this supply should be abandoned before its quality has become seriously impaired by the built up portion of the village.

2d. That the water from the proposed new well, obtained at a depts of 125 feet, while of satisfactory quality from a sanitary standpoint, contains an excessive iron content which will cause complaint on the part of the consumers unless a process for its removal is provided.

3d. That in view of these facts it appears advisable, in securing a new water supply, that the village obtain a more satisfactory location for wells at a point beyond the influence of contamination from the village, where water of entirely satisfactory quality may be secured.

EXAMINATION OF WATER FROM GRANVILLE.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
11119	1912 Jan. 16	17	13	slight	sl.musty	0.39	0.026	0.818	0.0002	0
12712	1913 June 21	4	90	heavy	musty	2.85	.038	.346	0	0
12722	June 24	0	53	heavy	none	1.23	.022	.358	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
11119	20	252	0.0	317	40	2.0	20	Not in 10 cc.
12712	25.3	242	2.5	538	28	10.4	60	Neg. in 10 cc.
12722	26.9	248.6	10	387	24	4.4	......	Bacterial Broken.

Source of Samples.

11119 — Proposed additional supply well No. 1, installed January, 1912.
12712 — Proposed additional supply well No. 2.
12722 — Proposed additional supply well No. 2.

REPORT ON PROPOSED WATER SUPPLY FOR HUBBARD.

On October 24, 1912, plans for a proposed water supply for Hubbard were received from Mr. William Wilson of Youngstown, consulting engineer for the village. A report upon these plans was delayed owing to the fact that suitable pumping equipment for testing the proposed supply was not installed until June 1913. For the purpose of examining the proposed water supply, visits were made by representatives of the State Board of Health October 1 and November 13, 1912, and June 24 and July 1, 1913. The following report was submitted:

Hubbard, a village with a population of 1850, is located in Trumbull County about four miles northeast of the city of Youngstown. The topography of the village is level and drainage takes place in a general northerly direction to Little Yankee Creek a tributary of the Shenango River. The locality is in the glaciated portion of the state and the drift deposits are upwards of 100 feet in thickness. The Berea sandstone underlies the drift.

At the present time the village is not provided with public improvements. In September 1910 plans for proposed sanitary sewers and sewage treatment plant were approved by the Board, but these improvements have not been completed. During 1912 a bond issue for $30,000 was provided for the installation of a public water supply.

PROPOSED WATER SUPPLY.

The plans for a proposed water supply for Hubbard provide for the development of a ground water supply obtained from tubular wells. In anticipation of the approval of the supply a large amount of construction work has already been done and practically the entire distribution system has been completed.

Site. The location selected for the supply wells is a tract of ground with an area of about four acres situated in the extreme northerly portion of the village between the Erie and Lake Shore and Michigan Southern Railroads. The site is immediately west of a small water-course tributary to Little Yankee Creek which flows through the village in a northerly direction receiving the surface drainage. The nearest habitation is about 300 feet east of the city, while in a southwesterly direction there are a number of dwellings within 1,000 feet. The embankment of the Lake Shore and Michigan Southern Railroad effectually protects the site from encroachment of habitation from the south. In a like manner the presence of the Erie Railroad will protect the site from the north. In general it may be stated that the sites selected for the supply wells is satisfactory.

Wells. At the present time only one well has been drilled, but it is proposed that a second well will be installed in the near future. The well is 10 inches in diameter and 279 feet deep. It penetrates alternate layers of sand, gravel, and clay through a depth of 145 feet where the Berea sandstone is encountered. The casing of the well is extended to the sandstone and the water supply is obtained from the formations encountered below a depth of 145 feet. The water rises under artesian pressure to a point of 25 feet below the surface of the ground. Pumping tests have indicated that the well will yield 150 gallons per minute or 216,000 gallons per 24 hours.

Quality of Water. Samples of the proposed supply have been collected on two occasions July 1 and August 12, 1913. The analyses of the first samples were somewhat unsatisfactory in bacterial content and indicated the presence of a considerable quantity of iron. The analyses of the later samples were, however, entirely satisfactory, due perhaps to continued pumping of the well. The second samples indicated that the supply is of good sanitary quality and free from objectionable mineral characteristics.

Water Works Equipment. It is proposed to pump the well by the use of an electrically driven deep well pump discharging directly into the distribution system. The pump will be driven by an electric motor and the entire equipment will be housed in a small brick structure. Provision of a single unit makes no allowance for emergencies which may arise to interfere with constant pumping. A duplicate well with pumping equipment should be installed. The distribution system which has practically been completed, consists of about five miles of mains and extends to practically all the built up portions of the village. A standpipe, 20 feet in diameter and 80 feet in height, with a capacity of 188,000 gallons, will be located in the extreme southwesterly portion of the village where the ground has the greatest elevation. The static head furnished when the standpipe is full is 155 feet at the central portion of the village.

SUMMARY.

The village of Hubbard proposes to install a public water supply to be obtained from wells satisfactorily located and deriving their supply from rock formations 150 feet or more below the surface of the ground. The quality of the water is satisfactory from a sanitary standpoint, and has no objectionable mineral characteristics. The plans for the development of the supply contain no features which would contribute to the deterioration of the water.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held September 2, 1913, the proposed water supply for Hubbard, developed according to plans received October 24, 1912, from Mr. William Wilson, of Youngstown, engineer for the village, were approved subject to the following conditions:

1st. That the village council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, preventing the establishment or maintenance of any privy vault, cesspool or other possible source of contamination of the supply within 500 feet of any public supply well; and,

2d. That this approval shall be void after January 1, 1914, unless the proposed supply shall have been placed in use prior to that date.

The Board advised that a duplicate well and pumping equipment be installed, to provide for emergencies which may arise to interfere with constant pumping.

EXAMINATION OF WATER FROM HUBBARD, OHIO.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
	1913									
12748	July 1	0	21.	dist.	none	.64	.010	.244	0	0
12749	July 1	0	21.	dist.	none	.61	.008	.258	0	0
13036	Aug. 12	0	4	vy. sli.	0	.14	.012	.234	0	0
13037	Aug. 12	0	4	vy. sli.	none	.05	.010	.242	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
12748	40.7	210.	none	346.	11.	1.6	530	Pos. 10 cc.
12749	38.3	209	none	343	15.	1.4	710	Pos. 10 cc.
13036	21.	190	none	272	24.	0.5	5	Neg. 10 cc.
13037	21.5	192	none	270.	23.	0.5	6	Neg. 10 cc.

Source of Samples.

12748 — Proposed water supply well No. 1. Collected by Mr. L. H. Van Buskirk.
12749 — Proposed water supply well No. 1. Collected by Mr. L. H. Van Buskirk.
13036 — Proposed water supply well No. 1. Collected by Dr. W. H. Button, health officer.
13037 — Proposed water supply well No. 1. Collected by Dr. W. H. Button, health officer.

REPORT ON PROPOSED WATER SUPPLY FOR KENMORE.

On August 27th and October 15, 1913, plans and specifications for a proposed water supply for Kenmore were received from the Payne-Gillen Engineering Company of Akron and The Central Engineering Bureau of Chicago, Illinois, engineers for the village. The plans were referred to the engineering department for investigation. On June 16, 1913, in anticipation of the submission of the plans, the principal assistant engineer visited Kenmore and examined the proposed improvement. The following report was submitted:

Kenmore, a village with a population of 1,561 in 1910, and an estimated present population of 2,000, is located in Summit County immediately southwest of the city of Akron. It is situated on the Great Divide on elevated ground lying between the Ohio Canal on the east and Mud Run on the west. The surface drainage from a portion of the village follows an easterly direction but the principal portion drains to Mud Run. A small portion of the village south of the Erie Railroad also drains in a southerly direction to Nesmith Lake on the watershed of the Tuscarawas River, which stream flows in a westerly direction about two miles south of the village. At the present time Kenmore is without municipal improvements but during the past year funds have been provided for a public supply and a complete system of sanitary sewers with sewage treatment works. At the present time the sanitary conditions within Kenmore are objectionable. A storm sewer which discharges into a ditch tributary to Mud Run northwest of the village carries considerable sewage and causes a decided nuisance at the outlet. No sewage from the village reaches Nesmith Lake.

PROPOSED WATER SUPPLY.

During the past year preliminary surveys have been made to locate a satisfactory water supply for the village. Locations at various points near the village were examined and a satisfactory supply was found at a point near Nesmith Lake about one-half mile south of the southerly corporation line of the village. The tests of this supply indicated that it was satisfactory in quantity and quality and plans have, therefore, been prepared for its development. The proposed water supply will be obtained from wells and pumped directly into a main leading to the distributing system. Storage will be provided by means of a standpipe.

Site. The village has purchased a tract having an area of 2.34 acres located on the northeast shore of Nesmith Lake, immediately west of the Akron-Manchester road. Immediately adjoining the site on the north is a dwelling, the wastes from which are disposed of in a privy vault of improper construction. This dwelling is 300 feet north of the nearest public supply well and although surface drainage is intercepted the pollution of the soil by the privy vault is a menace to the water supply. About 500 feet and 900 feet to the south of the nearest public supply well are dwellings, the wastes from which are disposed of in the same manner as before described. Although these dwellings, by their location, do not appear to greatly endanger the water supply, the method of disposal of the wastes must be controlled to prevent possible pollution of the soil. Future building along the Akron-Manchester road north of the site may be active and it will, therefore, be necessary to protect the wells from encroachment by the adoption of proper legislation. The elevation of the proposed site varies from 0 to 7 feet above that of Nesmith Lake. The wells will be placed at points having an elevation one foot and three feet above the lake, respectively. A portion of the site, at present poorly drained on account of its elevation, will be filled to a grade higher than the lake. The fluctuation of the level of Lake Nesmith is not sufficient to flood the site.

The general location of the proposed site is satisfactory and if proper control is exercised to prevent soil contamination at the three dwellings mentioned the water supply will not be endangered.

Wells. Two wells 75 feet from the lake and 400 feet apart will be installed. A ten-inch test well has been drilled at the site of one of the permanent wells to determine the quantity and quality of the supply. The permanent wells will be drilled or dug according to bids received for construction and pumping machinery. If drilled the wells will be similar to the test well already installed, which has a depth of 52 feet, penetrating 42 feet of "fine blue shaley sandstone," as stated by the driller (probably hard blue clay), and 10 feet of gravel. The casing extends to a depth of 46 feet below which is placed a brass strainer six feet in length . The water supply is obtained from the gravel underlying the impervious clay stratum and normally rises under artesian pressure to an elevation one foot above the level of Nesmith Lake. No details of the proposed dug wells are included in the plans. If used, the dug wells should be cased to the same depth as the drilled wells.

A pumping test of 180 hours duration carried on June 13th to 16th, 1913, indicated a yield from one well of 122,000 gallons per 24 hours. When pumping at this rate the water level was lowered ten feet, but full recovery of the well occurred immediately after the pump was stopped. It is probable that the development of two wells will be sufficient for the needs of the village.

Quality of Water. In connection with the pumping test for quantity. samples of the proposed supply were collected by a representative of the State Board of Health June 16, 1913. The analytical results indicate that the water is of satisfactory quality from a sanitary standpoint, and a very low organic content is shown. The rather high bacterial content is probably due to the newness of the well and the absence of intestinal organisms would indicate that the bacteria are not of dangerous nature. The chemical characteristics of the water are favorable and the hardness and iron are fairly low.

Water Works Equipment. The wells will be pumped by independent units, electrically driven, and placed in structures over each well. In case drilled wells are installed double acting deep well pumps will be used and in case dug wells are provided triplex extension pumps will be placed within the wells. The superstructures housing the pumps and electrical machinery are small brick buildings of substantial construction. Revolution counters will be placed upon the pumps and a Venturi meter will be installed on the main discharge line for the purpose of accurate measurement of the water pumped. The distributing system will comprise 4-inch to 12-inch cast iron pipe in the following lengths.

Sizes.	*Lengths.*
4 inch	67,700
6 inch	19,350
8 inch	4,705
10 inch	19.124
12 inch	2,540

It will cover the entire built-up portion of the village and the water supply will be made available to practically all of the inhabitants. Storage and equalized pressure will be secured by the installation of a standpipe in the northerly portion of the village. The standpipe proper will be constructed of riveted steel plates and will be 50 feet in height by 23 feet in diameter. Its capacity will be 150,000 gallons. It will be covered to prevent pollution of the supply. The steel standpipe will be surrounded by an ornate brick structure, which will add to the strength of the standpipe and will improve its appearance.

SUMMARY.

The plans for proposed water supply for Kenmore provide for utilization of wells at a site having a location in general satisfactory, but which may be affected by the wastes of three dwellings within 1,000 feet of the wells. The supply will be safeguarded if proper steps are taken to prevent soil pollution at these dwellings. The plans for development contain no improper features as a result of which the water supply may receive contamination after it is pumped.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the plans for a proposed water supply for Kenmore, received August 27th and October 15th, 1913, from The Payne-Gillen Engineering Company of Akron and The Central Engineering Bureau of Chicago, engineers for the village, subject to the following conditions:

1st. That the village council shall provide for the abandonment, cleaning, disinfection and filling of all existing leaching privy vaults and cesspools within 1,000 feet of any public supply well, and shall prevent the future construction of leaching privy vaults and cesspools within that distance;

2nd. That the water works authorities, in co-operation with the health authorities of the village, shall inspect the territory within 1,000 feet of any public supply well at least once each month to maintain sanitary conditions within this area;

3rd. That in case dug wells are utilized detail plans of their construction, satisfactory to the engineer of the State Board of Health, shall be submitted prior to their installation; and,

4th. That this approval shall be void unless the proposed water supply shall have been installed prior to January 1, 1915.

The village council was advised that it was of especial importance to control the sanitary conditions on the property lying adjacent to and immediately north of the water works property, and that such control would be facilitated by lease or purchase of the said property.

EXAMINATION OF WATER FROM KENMORE.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrates.	Nitrites.
	1913									
12655	June 16	none	none	none	none	0.0	.004	.002	0	0
12656	June 16	none	none	none	none	0.0	.002	.002	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
12655	4.7	119.0	30.	217.	33.	.5	2040	Neg. 10 cc.
12656	4.9	122.	30.	238.	36.	.4	1440	Neg. 10 cc.

Source of Samples.

12655 — Test well, north end Nesmith Lake.
12656 — Duplicate.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR KENTON.

On October 2, 1912, one of the assistant engineers visited Kenton and examined a proposed additional water supply for the city. On November 5 and 12, 1912, plans for the proposed improvements were submitted by Mr. W. P. Steffen, director of public service. On December 4, 1912, a second examination was made by one of the assistant engineers for the purpose of securing additional information. The following report was submitted:

Kenton, a city with a population of 7,200, is located in Hardin County near the headwaters of the Scioto River and near the Great Divide. The drainage from the principal portion of the city is in a southerly direction to the Scioto River and from a small district in the northerly portion into a small stream north of the city. The topography is in general flat. The geological formations consist of limestones, encountered near the surface in the southerly portion of the city and about 80 feet below the surface in the northerly portion.

Kenton is provided with a public water supply and sewers which cover a large portion of the city.

PRESENT WATER SUPPLY.

In describing the present water supply a brief resumé of the history of the supply will be given. The first supply was installed in 1883 by a private company, being obtained from a dug well 16 feet in diameter and 30 feet deep, located immediately south of the Scioto River at the site of the present station. An emergency intake in the Scioto River was also installed. In 1884 or 1885, owing to the failure of the dug well to supply sufficient water, six drilled wells, 100 to 125 feet deep, were installed by the company. In 1887 the city purchased the works, abandoned the dug well and drilled wells of the company and installed three new drilled wells 100 to 125 feet deep. In 1896, owing to a shortage of water the city installed a large open, unwalled dug well 40 feet by 40 feet in plan and 90 feet deep, extending from which was excavated a reservoir 120 feet long and 40 feet wide and 30 to 40 feet deep. In the bottom of the well three 8-inch wells were drilled to a total depth of 135 feet from the surface. The dug well penetrates a few feet of drift deposits, the remaining depth being through limestone. This supply was installed without the knowledge or approval of the State Board of Health and still remains in use. During 1896 the three wells installed in 1887 and also the emergency intake from the Scioto River were abandoned.

In 1899, with the approval of the State Board of Health, the water supply was further increased by drilling two wells, 136 feet and 175 feet deep, respectively, on the Calhoun property, so-called, about 1½ miles south of the center of the city. These wells still remain in use. In 1906, without the knowledge or approval of the State Board of Health, two drilled wells were installed near the pumping station, extending to depths of 240 to 290 feet. These wells are still used. In 1910, without the knowledge or approval of the State Board of Health, a third deep well was drilled near the pumping station and is now used. During 1912 two wells were drilled at points south of the pumping station and between the station and the Calhoun property. These were drilled without consulting the State Board of Health and are considered in this report as the proposed additional supply.

Summarizing the above, the present water supply comprises the large open dug well; four drilled wells 200 to 300 feet in depth near the pumping station; and two drilled wells on the Calhoun property. The water consumption is approximately 800,000 gallons per day, one-third of which is taken from the open well. This well is subject to danger of pollution which may reach it by seepage from the surrounding district. West of the well and within 500 feet is a built up district containing 50 or more dwellings which are provided with poorly constructed privy vaults. When the well is pumped down, seepage from all sides and at all elevations may be noted entering through the fissures in the limestone which almost reaches the surface of the ground. Undoubtedly this supply, if not distinctly unsatisfactory, must be regarded as being unsafe. Observations have shown that the elevation of the water in the drilled wells is influenced by pumping from the dug well. The rather direct connection between the dug well and the drilled wells in the vicinity of the pumping station would also indicate the danger of contamination of the latter wells. It is pertinent to note that all of these sources were installed illegally without the approval of the Board.

The Calhoun wells are suitably located, being in a sparsely settled locality, well removed from source of pollution. These wells, however, furnish only a small portion of the supply.

During 1912 extensive improvements have been made at the pumping station, including the erection of an entire new building, the installation of new pumping machinery, and the provision of a reinforced concrete covered receiving and storage reservoir of 2,000,000 gallons capacity. It should be noted that these extensive improvements were made without the knowledge of the State Board of Health; furthermore, without assurance of the permanency of the supply in use.

The open dug well is pumped by a deep well pump and all of the drilled wells are pumped by air lift. These low lift pumps discharge into the receiving and storage reservoir from which the service pumps take their suction.

PROPOSED ADDITIONAL SUPPLY.

To further increase the available supply, two wells have been recently installed at points south of the pumping station. One of these wells, known as the Carter well, is immediately south of the Erie Railroad near the Bellefontaine Road, about 1,000 feet south of the pumping station. The other well is located on the Bellefontaine Road at Letson Avenue about ¼ mile south of the Carter well and near the southerly corporation line of the city. The location of both wells is somewhat unfavorable, owing to the presence of scattered dwellings within 500 feet of each of the wells. The depth of the wells is approximately 200 feet, the water being obtained from the same horizon supplying the other wells. No adequate pumping tests have been made to determine the available yield, although irregular pumping by air lift has given evidence of good yield.

Quality of Water. On December 4, 1912, samples were collected from the two new wells proposed as the additional supply. The results of the analyses correspond somewhat closely with results of previous analyses of the existing supply, as they show an extremely hard water and one which contains an appreciable amount of iron. The excessive turbidity in each of the samples may be attributed largely to the newness of the wells, the suspended matter representing fine silt which is pumped from the interstices of the limestone. Continued pumping will no doubt clear the water as well as reduce the iron content.

SUMMARY.

From the foregoing report it will be noted that the city of Kenton has been lax in submitting to the State Board of Health plans for water supply improvements. At the present time the Calhoun wells are the only source in use which has been approved by the State Board of Health. The other two sources, namely, the open dug well and drilled wells near the pumping station have not been approved, and, furthermore, are unsatisfactorily located and will probably have to be abandoned. This is especially true of the dug well which offers opportunity for rather direct pollution of the water supply.

The proposed additional supply is satisfactory at the present time and may remain so indefinitely, depending upon the growth of the city.

Since the original installation of the water supply in 1883, constant difficulty has been encountered in securing a sufficient quantity of water for the needs of the city. The additional wells now proposed will no doubt increase the available supply to meet immediate demands, but the occurrence of another shortage within a few years seems probable. In seeking to increase and improve the water supply in the past the city has proceeded without employing an engineer, and therefore no comprehensive plan of development has been followed. Inasmuch as the present supply is not entirely satisfactory as to quantity, is objectionable on account of its mineral constituents, and in part is obtained from wells unfavorably located, it would appear that the city should immediately secure the advice of an expert to determine the logical procedure to be followed in selecting a permanent supply for the city satisfactory in quantity and quality.

ACTION OF THE BOARD.

At a meeting held January 22, 1913, the State Board of Health approved a proposed additional water supply for Kenton, as shown on plans received from Mr. W. P. Steffen, director of public service, November 5th, and 12th, 1912, to be obtained from two drilled wells 200 feet deep, located approximately 1000 feet and 2300 feet south of the pumping station, subject to the following conditions:

1st. That the city council pass an ordinance approved by the Secretary of the State Board of Health before its passage, providing that all privy vaults and cesspools within 500 feet of either well be removed or made watertight, and preventing the future establishment of any leaching privy vault, cesspool, or other source of pollution within that distance; and,

2d. That this approval shall be void unless the said ordinance shall have been passed and a certified copy of the same filed with the Secretary of the State Board of Health prior to March 15, 1913.

The Board voted to disapprove the supply obtained from the open dug well installed illegally in 1896, and to direct the city to abandon this supply.

The Board also voted to withhold approval of the supply obtained from drilled wells near the pumping station installed illegally in 1906 and 1910.

The Secretary was instructed to advise the city officials as follows:

1st. That the water supply obtained from the open dug well near the pumping station is subject to danger of pollution by leachings from privy vaults in the vicinity;

2d. That the direct connection between the dug well and drilled wells near the pumping station suggests the danger of pollution of the latter wells;

3d. That the water obtained from all sources in use is excessively hard and contains iron in objectionable quantities; and,

4th. That with a view to obtaining a permanent water supply satisfactory in quantity and quality the city should have a comprehensive study of all available sources made and recommendations as to the proper procedure submitted.

EXAMINATION OF WATER FROM KENTON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
	1912									
11748	Oct. 2	1	1.	trace	none	.05	.024	.2	.0002	.04
11750	Oct. 2	5.	4.	slight	none	.1	.05	.244	0	.1
11752	Oct. 2	0	0	trace	none	.05	.062	.024	.0008	.08
11753	Oct. 2	0	0	trace	none	.02	.016	.09	.0008	.1
11751	Oct. 2	5.	21.	vy.dist.	none	.2	.044	.37	.0002	.04
11971	Dec. 4	3.	135.	heavy	sl.musty	2.72	.026	.350	0	0
11972	Dec. 4	none	125.	heavy	none	.99	.026	.312	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
11749	11.8	283.2	282.5	882.	174.	3.0	1600	Neg. 10 cc.
11750	12.4	273.8	265.0	883.	119.	0.5	3	Neg. 10 cc.
11752	11.5	283.	237.5	855.	129.	1.	7	Neg. 10 cc.
11753	12.0	282.	237.5	841.	86.	1.	23	Neg. 10 cc.
11751	6.3	303	295.0	1054.	191.	4.	43	Neg. 10 cc.
11971	8.6	342.6	230.	1554.	104.	6.0	134	Gas. 10 cc. Neg. 10 cc.
11972	9.9	300.4	261.	1339.	132.	2.0	1100	Neg. 10 cc.

Source of Samples.

11749 — Open dug well.
11750 — Well No. 4, near pumping station. Present Supply.
11752 — Tap on distribution system.
11753 — Tap on distribution system.
11751 — Carter well, Well No. 6.
11971 — Letson Avenue well, Well No. 7.
11972 — Carter well.
The above samples were collected by R. F. MacDowell.

REPORT ON AN EXAMINATION OF A PROPOSED WATER SUPPLY AND WATER PURIFICATION PLANT FOR THE LIMA STATE HOSPITAL.

On October 15, 1913, Mr. F. L. Packard, architect for the Lima State Hospital, submitted general plans and specifications to the State Board of Health showing a proposed water supply development including a water purification plant for the Lima State Hospital. On November 3, 1913, information blanks, properly filled out by the architect's engineer were received. On November 10, 1913, a letter signed by Dr. M. F. Hussey, clerk of the board of commissioners for the erection of the Lima State Hospital, was received in which it is stated that the plans as submitted by the architect were approved on October 10, 1913, by the Commissioners. A representative of the State Board of Health visited the Lima State Hospital on November 19, 1913, for the purpose of inspecting the site of the proposed water supply reservoir. Based upon information obtained at the time of the inspection and after a review of the general plans submitted, the following report was submitted:

The Lima State Hospital which is rapidly nearing completion is located about three miles north of the city of Lima. The hospital is built to accommodate a population of 2,000. It is estimated, however, that the population following the completion will not exceed 1200.

The question of a water supply for the Lima State Hospital was first brought to the attention of the State Board of Health in the latter part of 1912. An examination of a test well which was installed during the latter part of 1912 was made by a representative of the State Board of Health. Details concerning the proposed water supply at that time may be found in a report dated December 16, 1912. Provisions have already been made for the collection of all rainwater which may fall upon the roofs of the buildings included in the state hospital group. The rainwater is to be stored in reservoirs located a short distance from the hospital and will be used for boiler and laundry purposes. It is necessary, however, that an additional supply for domestic uses be provided. A test well 400 feet in depth was installed near the power plant. The water obtained from the well was excessively hard and highly sulphureted. It was deemed advisable therefore to abandon the idea of obtaining a ground water supply. Following the attempt to secure a suitable supply from wells, it was proposed to obtain a surface supply from Sugar Creek which passes the northeastern corner of the state hospital farm. Samples were collected from Sugar Creek November 14 and December 12, 1912, which upon analysis showed an excessive quantity of salt, which is discharged into the stream from the numerous oil wells which are located upon the watershed. The hospital commission, however, has proposed to obviate this difficulty by securing the assistance of the Attorney General who will take legal steps to prevent the continued discharge of salt wastes into the stream from oil wells.

The plans submitted on October 15, 1913, show the development of the Sugar Creek supply. Sugar Creek is a small stream with a watershed area of approximately 26 square miles as given in the report of the principal assistant engineer, dated December 16, 1912. No definite information concerning the dry weather flow is available, but it is certain that it is insufficient to supply the demands of the hospital without the provision of a storage reservoir. The stream passes through a district which is very thinly populated and receives very little, if any sewage contamination, the only pollution being from oil wells, which have been described above. The effluent from the sewage treatment works, which is being installed for the State Hospital, will discharge into the Sugar Creek below the dam. A house belonging to the state has an outside privy located directly upon the edge of Sugar Creek. It will be necessary to remove the privy and highly advisable to remove the contaminated earth about the same in order to protect the supply which is to be stored in the reservoir.

PROPOSED DEVELOPMENT.

The proposed water supply is to include a reservoir development and rapid sand filtration plant. The filter plant will include low lift pumps, coagulation tanks, filters, clearwell, high service pumps and an elevated tank. The nominal capacity of the plant will be 746,000 gallons per 24 hours. The consumption will not exceed 180,000 gallons per 24 hours at the time the plant is to be placed in operation.

Reservoir. It is proposed to construct a reservoir which when filled with water will have an area of approximately six acres. The water of Sugar Creek will be impounded by means of a reinforced concrete dam 200 feet in length and built on a radius of 900 feet. The dam is to extend from the east abutment of the bridge on the Sugar Creek road diagonally across the present stream bed. The footings of the dam will be placed directly on the limestone bedrock which is encountered at an elevation of approximately 803 at the site of the proposed dam. It will be 9 feet 6 inches in height and have a cross sectional area of 31.4 square feet, and will be reinforced with vertical $\frac{3}{8}$ inch reinforcing rods spaced 7.5 inches on centers and horizontal $\frac{1}{4}$-inch rods spaced 5.5 inches on centers. As noted above the dam will impound the water over an area of approximately 6 acres, two of which lie above the Sugar Creek road and the remaining four acres immediately below. It will be observed, therefore, that the reservoir will be divided into two sections by the road already mentioned. The drainage from this road will be carried to the creek below the dam. The reservoir will be formed by means of excavation and retaining walls. The soil is to be removed to the underlying rock. This necessitates the removal of from six to seven feet of earth over the entire area.

The portion of the reservoir lying to the south of Sugar Creek road will be provided with a concrete retaining wall along the road, extending from the proposed dam to the embankment of the Ohio Electric Railway to the east. The remaining portion, which includes the south and west bank of the present stream and extending from the Ohio Electric culvert to the end of the concrete retaining wall at the southerly end of the dam, will be graded properly and faced with stone. The stone used are to be not less than two inches in thickness, eight inches wide and twelve inches long and are to be set at right angles to the slope of the bank, closely fitted in place with all joints filled with local bank sand. Similar provisions are made for the protection of the west bank of the stream immediately below the proposed dam. The lower portion of the reservoir which lies to the north of the Sugar Creek road is to be provided with earth retaining walls along the west and north sides and a concrete retaining wall along the Sugar Creek road. The Ohio Electric embankment acts as the retaining wall to the east. A road which now extends along Sugar Creek will be placed along the top of the west retaining wall. The Sugar Creek road will also be graded in and raised to a maximum height of about four feet above its present elevation. Two sluice ways, each 2 feet square, are to be placed beneath the Sugar Creek road and will be the only connection between the two portions of the reservoir.

In addition to the control of the oil well wastes, which at present reach Sugar Creek, it is intended to further obviate the difficulties incident to the discharge of salt wastes into the creek by allowing the dry weather flow to pass through the smaller portion of the reservoir into Sugar Creek below the dam. At times of high water, when the dilution is sufficient to make the salt unobjectionable, a gate which is provided in the dam will be closed and the sluice ways to the larger reservoir opened so that the water of better quality, that is, of lesser chlorine content, may pass into that portion from which the main suction will be taken. In this manner the dry weather flow will not be intercepted unless a shortage of water is imminent. As mentioned above an opening is provided in the dam so that the lower reservoir may be drained. The gate is 18 inches square and is placed at an elevation of 804.83.

In the smaller portion of the reservoir a spillway extends the entire length of the dam. The larger division of the reservoir, however, is necessarily provided with an independent spillway. The spillway for the larger basin is 27 feet long and comes into service when the water reaches an elevation of 812.5, which is the same elevation as the spillway of the dam. The spillway is provided with three openings each 6 feet by 1 foot 7 inches in section. The roadway passes above the spillway.

Intakes. Two intakes are provided, the main intake line is 12 inches in diameter and extends to the larger portion of the reservoir where it terminates in a so-called suction or screen chamber. This chamber is located to the north of the Sugar Creek road and is 15 feet 9 inches by 6 feet in plan. Within the house provisions have been made for three screens, placed 3½ inches on centers. The first screen is made of ½ inch rods spaced both vertically and horizontally, 4 inches on centers. The second has a 1½ inch mesh and is to be constructed of No. 6 B and S gage wire. The third has a ¾ inch mesh and is constructed of No. 8 B and S gage wire. The second intake branches from the main line near the pumping station and extends to the smaller portion of the reservoir. The intake line, as well as the sluice ways, and gate in the dam are provided with suitable valves.

Low Lift Pumps. Two submerged centrifugal pumps, each with a capacity of 500 gallons per minute are connected with a 12-inch suction line. Each pump is provided with a 5-inch discharge line which is connected with an 8-inch main discharge line which leads to a small compartment placed between the two settling basins and from which the flow of water to either or both of the settling basins is regulated.

Coagulation Basins. Two coagulation basins, each 27.5 feet by 15 feet in plan with an average depth of 6.4 feet are provided. The capacity of each tank is 17,740 gallons or a combined capacity of 35,480 gallons. This provides a period of retention of 1.14 hours, which is insufficient to properly settle the water. In a letter dated November 4, 1913, signed by Mr. F. L. Packard, it is stated that the settling capacity will be doubled.

The water entering the settling basin is received in a compartment which is provided with a weir 5.25 feet in length and 18 inches in depth and which is pierced at the bottom with two openings, each one foot square, through which the sludge can be flushed to the sewer openings. A baffle is placed 9.5 feet from the inlet end and extends partially across the tank so that a direct current from the inlet to the outlet weir is prevented. A compartment is placed at the outlet end similar in every detail to the one at the inlet end from which the water passes to a small tank 2.5 feet wide and 8 feet long, from which it flows by gravity to the filters. It is stated on the information blank that alum is to be used as coagulant but no details are shown as to the alum feed. A small chamber immediately in front of the control chamber at the inlet end of the tanks is connected to the sewer.

Filters. Two filters, each 14.5 by 9 feet in plan having an area of 130 square feet, are provided. This makes a total filter area of 260 square feet, which when the filters are operated at the rate of 125 million gallons per acre per day provides a filter capacity of 746,000 gallons. The plans show two washwater troughs but no details as to depth of sand, collector system and strainers are shown. It will be necessary to require more detailed plans in order to ascertain the detailed construction of the filter units.

Clear Well. The general plans do not show clearly the dimensions of the clear well. As near as could be ascertained the clear well is 22 feet by 19 feet in plan and has a depth of 12 feet. It is necessary to deduct from this capacity the volume occupied by the high service pump pits. The plans provide for locating the pumps in a wet well. To protect the quality of the filtered water a dry well should be used. The clear well capacity provided a total storage of 28,500 gallons, or a period of retention of .9 hour, based on the nominal capacity of the plant. Taking 180,000 gallons as the estimate of pumpage the period is increased to 3.8 hours. It is proposed to treat the water as it is discharged into the clear well with calcium hypochlorite, but no details as to the apparatus to be used are shown.

High Service Pumps. Two two-stage submerged centrifugal pumps are to be used for the high service pumping equipment. The water will be elevated to an elevated tank which will have a total height of 164 feet and from which the water will flow by gravity to the state hospital buildings. The elevated tank will have a capacity of 100,000 gallons.

SUMMARY.

The plans for the proposed water supply for the Lima State Hospital, as submitted by Mr. F. L. Packard, architect for the Lima State Hospital Commission, show a proposed reservoir development on Sugar Creek together with the installation of a water purification plant. The water from Sugar Creek contains an abnormally high chlorine content, which will not be removed by rapid sand filtration. It is proposed to control the discharge of oil well wastes into Sugar Creek, and thereby reduce the chlorine content. In addition to this precaution it is proposed to store the discharge of Sugar Creek during times of freshet in order that the chlorine content will be largely reduced by dilution. The water purification plant is of the rapid sand type and will be comprised of two settling tanks which are of insufficient capacity, two filters, which will have a nominal capacity of 746,000 gallons per 24 hours, a clear well, elevated tank and suitable intakes and pumping machinery. Details concerning the installation are not shown on the plans, especially is this true of the filters, chemical treatment and clear well. It will be necessary, therefore, to require more comprehensive plans before more than the general proposition can be approved.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the plans for a proposed water supply and water purification plant for the Lima State Hospital, received October 15, 1913, from Mr. Frank L. Packard, architect for the board of commissioners, subject to the following conditions:

1st. That an existing privy vault on the bank of the proposed reservoir shall be abandoned and a method of disposal of the sewage from the dwelling and proposed water purification plant satisfactory to the State Board of Health shall be provided; and that in the abandonment of the privy vault the contents and surrounding contaminated earth shall be removed and the excavation disinfected and filled with clean earth or ashes;

2nd. That prior to the installation of the proposed water supply, the board of commissioners shall take steps to prevent the drainage to Sugar Creek of wastes from existing and future oil wells on the watershed area of the stream;

3rd. That the proposed coagulation basin shall be increased in capacity to provide a satisfactory period of flow;

4th. That revised detail plans for the coagulation basin, filters, clear well and chemical devices shall be submitted to and receive the approval of the Engineer of the State Board of Health prior to the installation of the plant;

5th. That samples of the proposed filtering material shall be submitted to and approved by the Engineer of the State Board of Health before the material is placed; and,

6th. That this approval shall be void unless the proposed water supply and water purification plant shall have been installed in accordance with the foregoing conditions prior to January 1, 1915.

REPORT ON PROPOSED WATER SUPPLY FOR MAGNOLIA.

On July 28, 1913, a request for approval of a proposed water supply for Magnolia was received from Mr. W. L. Hime, mayor. Plans for the proposed supply were received from Mr. L. E. Chapin, consulting engineer for the village, on November 14, 1912. Visits to Magnolia were made by representatives of the State Board of Health November 2, 1911, April 10th and 19th, May 7th and June 11, 1912, and on July 2, 1913. The following report was submitted:

Magnolia, a village with a population of 550, is located in Carroll and Stark Counties on Big Sandy Creek and on Sandy and Beaver Canal. Big Sandy Creek flows in a general southerly direction a few hundred feet west of the built up portion of the community and the Sandy and Beaver Canal parallels the stream, its course being immediately west of the built up portion. The topography is rather hilly, the only level ground being found in the valley of the creek. The drift deposits are of glacial origin and have a considerable thickness in the stream valley, while the capping in the hills is thin. The gravel formations in the stream valley are abundantly water bearing.

The private wells throughout the village are drilled or driven and vary in depth from 125 to 230 feet. The deeper wells which are in the hills produce a hard and iron bearing water which is objectionable. The shallower wells obtain their supply in the drift formations in the valley.

PROPOSED WATER SUPPLY.

The question of the proposed water supply at Magnolia was first brought to the attention of the State Board of Health in November, 1911, when it was proposed to locate the supply wells upon a site immediately west of the Sandy and Beaver Canal, near the central portion of the village. This site was found to be unsatisfactory and the local officials were so advised. At this time it was observed that a more favorable site for the wells was in the valley of Big Sandy Creek, north of the village. In April, 1913, it was proposed to install wells at a site about 700 feet west of the Sandy and Beaver Canal immediately east of Big Sandy Creek. This site is opposite the central portion of the village. In July, 1912, the State Board of Health disapproved of this site owing to its somewhat unfavorable location and advised the village to locate wells in the valley of the creek north of the community. At the time this action of the Board was taken the village had installed the distribution system and one well and proceeded to complete the installation, apparently for fire protection only.

Site. The site upon which the public supply wells are located is a tract of ground with an area of about one acre; its central portion being about 800 feet west of the Sandy and Beaver Canal and about 200 feet east of Big Sandy Creek. The easterly limits of the site are about 900 feet west of the central portion of the village. The nearest buildings are two farm houses located about 400 feet southwest of the site on the opposite side of the creek. The nearest dwellings within the village are about 500 feet east of the site. The topography of the site is flat and its elevation is such that it is subject to overflow during high stages of Big Sandy Creek.

Wells. The supply is obtained from three 6-inch wells drilled and cased to a depth of about 75 feet and obtaining water from the gravel formations encountered at a depth of about 65 feet. The following log of well No. 1 indicates the formations penetrated:

Fine loam	20 feet
Coarse sand	40 feet
Sand and gravel	5 feet
Gravel (waterbearing)	9 feet
Total	74 feet

In the drilling of the wells water was found in a small quantity above the 65 foot depth, but at this point a supply was found under artesian pressure, which elevated the water to a point 5 feet below the surface. Pumping tests indicate that a plentiful supply is available.

Quality of Water. The quality of the water obtained from the wells is demonstrated by the analyses of samples collected June 11, 1912, and July 6, 1913. The results indicate that the water is of a satisfactory sanitary quality, free from organic pollution. The only objectionable characteristic in the analyses is the high iron content which causes the water to become turbid on standing, and stains plumbing fixtures, etc. Should the iron content not decrease it will be necessary to provide a process for its removal to make the supply entirely satisfactory to avoid deterioration of the equipment.

Water Works Equipment. The wells are pumped by direct suction by a triplex power pump operated by a gasoline engine. Only one pumping unit has been installed. The distribution system comprises 1.16 miles of 4-inch and 6-inch mains, 14 per cent of which are 4 inches in diameter. A distributing reservoir is located on elevated ground a short distance west of Big Sandy Creek about 600 feet from the pumping station. This reservoir is a decagon in plan 36 feet in diameter and 14 feet in depth to the flow line, and has a capacity of 108,500 gallons to the flow line. A 6-inch connection from the mains enters the bottom of the reservoir serving as an inlet and outlet main. The reservoir is constructed of reinforced concrete and is provided with a roof supported on columns and beams.

SUMMARY.

The village of Magnolia has requested approval of the public water supply installed at the site disapproved by the State Board of Health

July 18, 1912. The location of the site is not ideal and it may be possible that the wells will receive contamination at some future date. However, the quality of the supply as demonstrated by analyses of samples collected on two occasions is satisfactory from a sanitary standpoint and shows no evidence of organic pollution. The development of the water supply is satisfactory and contains no features which would contribute to its deterioration. It would appear that the Board should approve the water supply as installed.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held September 2, 1913, the proposed water supply for Magnolia, developed according to plans received from Mr. L. E. Chapin, consulting engineer, November 14, 1912; (request for approval of which was received July 28, 1913, from Mr. W. L. Hime, mayor of the village), was approved subject to the following conditions:

1st. That a process for the removal of the excessive iron content of the water shall be installed when required by the State Board of Health; and,

2nd. That the proposed supply wells shall be abandoned and new wells installed at a site satisfactory to the State Board of Health, if future examinations should show a deterioration of the sanitary quality of the supply.

The Board advised that duplicate pumping equipment be installed as soon as the financial condition of the village will permit.

The mayor and council were informed that the foregoing approval of a water supply obtained from wells at a site disapproved by the State Board of Health July 18, 1912, was granted owing to the present satisfactory sanitary quality of the supply and that the Board reserves the right to require the installation of new wells at a more favorable location if future examinations show a deterioration in the sanitary quality of the supply.

EXAMINATION OF WATER FROM MAGNOLIA.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
11447	1912 June 11	0	13	slight	none	.34	.028	.348	.0002	0
12767	1913 July 6	0	15	dist.	none	.18	.026	.408	0	0
12768	July 6	5	5	vy. sli.	none	.33	.016	.166	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
11447	3.5	163	2.5	223	12	1.1	100	Pres. in 10 cc.
12767	5.0	197	0.0	218.	10	2.2	220	Neg. in 10 cc.
12768	5.3	194	0.0	216.	17	0.8	240	Neg. in 10 cc.

Source of Samples.

11447 — Test well No. 1, 74 feet drilled into gravel.
12767 — Pumping Station.
12768 — Pumping Station.

REPORT ON PROPOSED NEW WATER SUPPLY FOR THE OHIO STATE SANATORIUM NEAR MOUNT VERNON.

On January 6, 1913, Dr. S. A. Douglass, superintendent of the Ohio State Sanatorium, submitted a plan for the development of the proposed new water supply for the institution. Prior to the submission of this plan the chief engineer examined the proposed water supply on November 19, 1912, and one of the assistant engineers examined the proposed supply on November 29, 1912. The following report was submitted:

The Ohio State Sanatorium, an institution maintained by the State of Ohio for the treatment of incipient pulmonary tuberculosis, is located a short distance north of the city of Mt. Vernon in Knox County. The institution at the present time has a population, including attendants, of 140.

The public water supply, installed at the time of the establishment of the institution, is obtained from three springs which outcrop at the foot of the hill on which the buildings are located. The springs are developed by means of an open concrete basin 80 by 30 feet in plan and about 5 feet in depth. From this basin the flow of the springs is conveyed by gravity to a circular collecting well at the pumping station, having a capacity of 120,000 gallons. The yield of this supply at the time of its installation was estimated about 120,000 gallons per day. However, the yield has decreased materially and at the present time does not exceed 75,000 gallons per day. The water consumption at the institution is excessive, due in part to losses by leakage from the mains, standpipe, and plumbing fixtures. The present yield of the springs is at times inadequate to supply the demands of the institution and it has become necessary to install an additional supply or an entire new supply.

The quality of the existing supply has been found satisfactory by several analyses, although from aesthetic reasons, owing to the location and exposure of the collecting basin, it has been deemed desirable by the authorities of the institution to secure a new supply.

PROPOSED NEW WATER SUPPLY.

In developing a new water supply it is proposed to utilize drilled wells obtaining water from a deep stratum and to abandon the existing supply entirely. Two wells have been drilled at a point near the pumping station and power house. These wells are designated as wells Nos. one and two and are, respectively, 67 feet and 216 feet in depth. The wells penetrate the following formations:

	Thickness.	
Strata.	*Well No. 1*	*Well No. 2*
Sand and gravel	20 feet	20 feet
Blue clay	42 feet	78 feet
Sand rock (waterbearing)	5 feet	6 feet
Blue shale	....	2 feet
Sand rock	....	19 feet
Sand rock, blue	....	5 feet
Blue shale	....	86 feet
Total	67 feet	216 feet

The water is obtained from the sandstone stratum underlying the shale and rises under artesian pressure to such an elevation that the wells will flow freely when not being pumped. The casings of the wells are 10 inches in diameter and are driven into the sand rock 62.8 feet deep in well No. 1 and 103.7 feet in well No. 2. The surface and shallow subsoil water is thus excluded from the wells.

Wells Nos. 1 and 2 are located 150 feet apart in a line 50 feet west of the pumping station building. There are no sources of contamination within 1,000 feet of the wells, unless a sewer from the power house might be considered as such. The artesian character of the wells would render the danger of pollution unimportant, but in event of the lowering of the water level and the loss of the artesian character, pollution from short distances might reach the supply. It would be advisable. in view of this possibility to examine the sewer line at all points less than 500 feet from the wells, and if the joints are found leaky to replace the line with cast iron pipe with leaded joints.

The plan for the development of the supply provides for a circular concrete basin about 6 feet in diameter and 3.5 feet in depth, the top extending about 6 inches above the surface of the ground. This basin will be covered with a substantial wooden roof and will adequately provide protection for the top of the well. A suction line flanged to the casing will extend into the well and will connect through a gate valve and check valve to the pump suction. A T connection from the suction through a gate valve provides for the discharge of a natural artesian flow of the well into a gravity line which will convey the water to the collecting well.

Quality of Water. The quality of the proposed additional supply is demonstrated by analysis of several samples collected during November and December, 1912. The results indicate that the supply is of an entirely satisfactory quality from a sanitary standpoint and suitable in its raw state for drinking purposes. The water may also be classed as a moderately soft one considering its source, and the iron content is very low. It contains a small amount of sodium carbonate, which constituent in a larger amount would be objectionable if the water is used for boiler purposes.

Quantity of Water. No exhaustive tests to determine the available quantity of the supply have been made. On December 11, 1912, Well No. 1 was pumped by air lift for three hours at an average rate of 350 gallons per minute. After pumping had ceased the water level was immediately recovered and the flow of the well from the top of the casing continued. These facts indicate that at the present time the yield of the supply is sufficient for the needs of the institution.

ACTION OF THE BOARD.

At a meeting held January 22, 1913, the State Board of Health approved a proposed new water supply for the Ohio State Sanatorium, to be obtained from two drilled wells located near the power house of the institution and to be developed according to a plan received from Dr. S. A. Douglass, superintendent, January 6, 1913, subject to the following conditions:

1st. That the sewer line leading from the power house be examined and if found to be in a leaky condition, be replaced with a line of cast iron pipe to a distance of 500 feet from the wells.

2nd. That this approval shall be void unless the proposed new supply shall have been installed prior to September 1, 1913.

EXAMINATION OF WATER FROM MOUNT VERNON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
	1912									
11858	Nov. 4	......	4.	vy. sli.	none	.05	.014	.058	0	.2
11926	Nov. 19	none	none	vy. sli.	none	.05	.040	.126	0	.0
11960	Nov. 29	......	......	......	....	......	......	......	......	......
11995	Dec. 12	......	......	......	....	......	......	......	......	......
12018	Dec. 23	3.	none	none	none	.06	.020	.522	0	0
11912	Nov. 17	0	none	none	none	0.0	.024	.202	0	0
11927	Nov. 19	3.	none	trace	none	.1	.048	.218	0	0
11961	Nov. 29	......	......	......	....	......	......	......	......	......
11996	Dec. 12	......	......	......	....	......	......	......	......	......
12019	Dec. 23	5.	none	vy. sli.	none	0.0	.018	.268	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Total Hardness.	Residue on Evaporation		Iron.	Bacteria.	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
11858	7.3	145.	......	....	176.	15.	.6	10	Neg. 10 cc.
11926	8.5	147.	0.0	....	173.	6.	0.0	300	Neg. 10 cc.
11960	48.1	189.	none	167.88	......	......	......	......	No bac. samp.
11995	......	....	......	....	......	......	......	......	Neg. 10 cc.
12018	86.	186.	none	....	341	18.	.2	......	No bac. samp.
11912	34.8	164.	0.0	....	......	......	......	......	No bac. samp.
11927	33.3	164.	0.0	....	227.	18.	.35	1200	Neg. 10 cc.
11961	24.7	169.2	none	153.48	......	......	......	......	No bac. samp.
11996	......	....	......	....	......	......	......	......	Neg. 10 cc.
12019	20.8	171.	none	....	224.	22.	.2	......	No bac. samp.

Source of Samples.

11858 — Collected by Mr. S. A. Douglass.
11926 — Collected by Mr. W. H. Dittoe.
11960 — Collected by Mr. L. H. Van Buskirk.
11995 — Collected by Mr. Weldon Close.
12018 — Collected by Mr. Weldon Close.
} Well No. 1.

11912 — Collected by Mr. Weldon Close.
11927 — Collected by Mr. W. H. Dittoe.
11961 — Collected by Mr. L. H. Van Buskirk.
11996 — Collected by Mr. Weldon Close.
12019 — Collected by Mr. Weldon Close.
} Well No. 2.

	Magnesium.	*Alkali Carbonates.*
11960	12.76	11.12
11961	12.	15.72

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR NELSONVILLE.

On June 10, 1913, plans prepared by Mr. Arthur Giesler, consulting engineer, for a proposed additional water supply for Nelsonville were received from Mr. C. C. Sharp, director of public service. The plans were referred to the engineering department and based upon information obtained by previous investigations, and upon an examination of the plans, the following report was prepared:

Nelsonville, a city with a population of 12,000, is located in Athens County on the Hocking River. The city is provided with a public water supply installed in 1894 and a fairly complete separate system of sewers constructed in 1895. The topography of the surrounding country is rather hilly, except in the valley of the Hocking River which has a level flood plain about one-half mile in width. The city is located to the north of the stream which at this point flows in an easterly direction.

EXISTING WATER SUPPLY.

When first installed the water supply of the city was obtained from a dug well in the valley of the Hocking River a short distance west of the westerly corporation line of the city. This well was located south of the stream on an area of about one acre owned by the city for water works purposes. The well which is still in use is 22 feet in diameter and about 20 feet deep. In 1908 a shortage in the supply from the dug well was experienced and five tubular wells were sunk in the river valley deposits to a depth of about 14 feet below the dug well. These wells were all placed within 25 feet of the dug well and subsequent pumping demonstrated an interference between the wells. During the past few years a shortage of the supply has been experienced and it is, therefore, proposed to improve the supply both by well extension and by improvement in pumping facilities.

The water supply is drawn from the dug and tubular wells through a common suction line leading directly to the pumps and is discharged into the distribution system which is provided with a distributing reservoir with a capacity of 750,000 gallons. This reservoir is built of concrete and has a wooden roof.

The quality of the present supply as demonstrated by several examinations by the State Board of Health is satisfactory from a sanitary standpoint. The various analyses indicate traces of organic contamination which, however, is not of a serious nature. The hardness of the water and the presence of iron are the only objectionable characteristics.

PROPOSED ADDITIONAL WATER SUPPLY.

The plans for a proposed additional water supply contemplate the abandonment of all existing tubular wells, the retention of the dug well and the ultimate installation of nine 8-inch tubular wells. The provision of a new suction line and improved pumping facilities will assist in increasing the water supply.

Site. The site for the proposed additional supply includes the present water supply property, 259 by 200 feet, and an additional area of one acre (200 feet square) lying immediately north of the present property toward the river. There are a few scattered dwellings within 500 feet of the site in a southerly direction upon elevated ground bordering the valley of the Hocking River. Between these dwellings and the site is the right of way of the Hocking Valley Railroad which will prevent further encroachment in this direction. The remoteness of these dwellings and the character of the formations within the valley indicate that the supply is not in danger of contamination from these sources. The elevation of the site is such that it is flooded during high stages of the Hocking River. It has been necessary to raise the curbing of the dug well to avoid the entrance of flood waters. It is not thought that the flooding of the surface can influence the quality of the supply obtained from tubular wells.

Wells. Aside from the existing dug well it is proposed to ultimately install nine tubular wells. These wells will be drilled 100 feet or more in depth to the rock and will be cased with 8-inch wrought iron to the full depth of the well. At the bottom will be placed a strainer 8 feet in length. The top of the casing will end at the surface of the ground at which point it will be capped tightly. The suction line from each well will be placed about 23 feet below the surface of the ground and will be provided with cut-off valves, the stems of which will be extended to the surface. The individual suction lines from the wells will be connected with a main suction of 16-inch pipe. This suction line will be laid on a slight upward grade terminating in a standpipe 36 inches in diameter to which will be connected a vacuum pump to relieve suction on the service pumps. This standpipe will also serve as a sand catcher and may be blown off at intervals. The standpipe will be placed in a concrete chamber 11 feet in diameter and about 32 feet in depth below the surface of the ground.

The quality of the proposed additional water supply will probably be similar to that of the present supply. Although satisfactory from a sanitary standpoint the existing supply is very hard and contains an excessive quantity of iron which imparts a turbidity to the water and stains plumbing fixtures and fabrics. It is possible that water of a more satisfactory quality as regards iron may be obtained at a greater depth than that penetrated by the existing wells, and the question of the necessity of an iron removal plant should be deferred until test wells have been drilled.

At the present time owing to the lack of funds, it is impossible for the city to complete the installation of an additional water supply as shown on the plans, and it is intended to install four of the proposed new wells. These wells will be located at the northerly end of the present water works property. At a future date as conditions warrant the plans will be carried out completely.

SUMMARY.

The city of Nelsonville is provided with a water supply of satisfactory quality from a sanitary standpoint, but of inadequate quantity. The inadequacy has been due to improper location and drilling of wells and to inefficient pumping appliances. The plans for the additional supply provide for a suitable well development and an improvement as regards the pumping of the supply. The quality to be obtained from the proposed new wells will probably be identical with that obtained from the present wells.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the proposed additional water supply for Nelsonville to be developed according to plans prepared by Mr. Arthur Giesler, consulting engineer, and received from Mr. C. C. Sharp, director of public service, June 10, 1913, were approved subject to the following conditions:

1st. That the city council pass an ordinance, approved by the Secretary of the State Board of Health, preventing the establishment or maintenance of any leaching privy vault, cesspool, or other possible source of contamination of the water supply within 500 feet of any public supply well;

2d. That the quality of the proposed additional water supply, as demonstrated by the analyses of samples collected subsequent to pumping tests of the wells, shall be satisfactory to the State Board of Health;

3d. That a deferrization plant to remove the excessive iron content of the water be installed when required by the State Board of Health; and,

4th. That this approval shall be void unless the aforesaid ordinance shall have been passed prior to September 1, 1913, and the proposed additional water supply shall have been installed prior to June 1, 1914.

REPORT ON PROPOSED WATER PURIFICATION PLANT FOR PAINESVILLE.

On June 23, 1913, detail plans for a proposed water purification plant for Painesville were received from Mr. R. Winthrop Pratt, consulting engineer for the city. The plans and specifications were referred to the engineering department and on June 26, 1913, the chief engineer visited Painesville and made an investigation relative to the proposed improvement. After an examination of the plans the following report was submitted:

Painesville, a city with a population of 5,600, is located in Lake County on the Grand River, about three miles above its entrance into Lake Erie. Fairport, a village with a population of 2300, is situated at the mouth of the Grand River, and Richmond, a village with a population of 300, is located about one mile above the mouth of the river. These two villages are furnished with the water supply of Painesville. Painesville is provided with a system of sewers constructed on the separate plan with outlets into the Grand River. Fairport and Richmond have a few short combined sewers discharging into the river. The principal pollution of the Grand River at Painesville is caused by the wastes from the plant of The Diamond Alkali Company, which was established in 1910.

EXISTING WATER SUPPLY.

The present water supply of Painesville is obtained from two sources. Untreated lake water is drawn through an intake extending 215 feet into Lake Erie to a point about 4500 feet southwest of the mouth of the Grand River. Breakwater piers carry the discharge of the river to a point about 5700 feet northeast of the intake. A portion of the supply is also obtained from galleries collecting the shallow subsoil water along the shore of the lake. These galleries fail to provide an adequate quantity of water at all times and the direct intake from Lake Erie is, therefore, frequently used. The quality of the water obtained from Lake Erie through the present intake is unsatisfactory from a sanitary standpoint. The pollution of the supply results from the sewage discharged at the outlet of the Cleveland main intercepting sewer at a point 20 miles west of the intake and from the discharge of the Grand River which is diverted to an intake under certain meteorological conditions. Previous investigations of the State Board of Health have shown that the present supply obtained from Lake Erie is unfit for domestic purposes at all times, regardless of the direction of wind currents.

The present pumping station equipment is in a rundown condition and does not satisfactorily serve the needs of the city. No storage on the distribution system is provided, and it is, therefore, necessary to operate the pumping station continuously. The water supply is used very generally for domestic purposes in Painesville, Fairport and Richmond. Ground water is difficult to obtain and the number of private wells is, therefore, small. The water consumption in the three municipalities is approximately 1,600,000 gallons daily, of which 600,000 gallons are used by railroads.

PREVIOUS ACTIONS OF THE STATE BOARD OF HEALTH.

The water supply of Painesville has been given frequent attention by the State Board of Health since 1895. At that time the supply was owned by a private company and was obtained from galleries along the shore of the lake. The Board disapproved of the extension of the galleries in 1895, but subsequently the company proceeded to install additional galleries in violation of the Board's action. In 1906 the city purchased the water supply and during the same year an examination of the supply was made by the State Board of Health. At this time it was found that the supply was inadequate and of unsatisfactory quality, and the city was advised to install a water purification plant. In 1910 the State Board of Health considered proposed extension of the water works intake to a point 2500 feet from the shore and after investigation approved the extension only upon condition that a water purification plant be installed at the same time the extension was made. Subsequently the city failed to make the proposed extension or install a purification plant.

On April 7, 1913, a petition under Section 1252 of the General Code, signed by ten per cent. of the electors of the city was received, the said petition asking for an investigation of the water supply of the city and an order for the installation of a water purification plant. After an investigation the State Board of Health ordered the city to install a water purification plant and have the same in operation prior to January 1, 1914. This order was signed by the Governor and Attorney General of Ohio, and transmitted to the authorities of the city of Painesville on April 13, 1913.

PROPOSED WATER PURIFICATION PLANT.

The plans of the consulting engineer provide for the installation of a new intake and a water purification plant of the rapid sand filter type with a nominal capacity of 3,000,000 gallons per twenty-four hours. The proposed new plant will be installed at the site of the existing pumping station but with the completion of the new plant the existing intake, galleries, and practically all features of the pumping station will be abandoned. The main features of the proposed improvement include an intake, coagulant devices, coagulating basins, filters, clear water basin, and pumping station equipment.

Intake: The proposed new intake line will extend 1500 feet from the existing intake well and 1260 feet from the shore line. It will be constructed of 24-inch pipe laid at a constant grade of .9 per cent. The water will be taken at a depth of 16 feet, and the intake line will discharge into the intake well at an elevation 9 feet below the lake level. The intake will be protected by timber crib work filled with stone and surrounded with rip rap, and the water will be drawn through a galvanized iron screen provided with five hundred and ninety 1-inch holes. Future extension of the intake is provided for by placing a blank flange at the end of the line. The intake well (existing) is constructed of brick, circular in plan, 30 feet in diameter by 25 feet deep, and is covered with a conical wood roof. The low lift pumps will have a 16-inch suction line leading from this well.

Coagulant Devices. It is proposed to use a solution of aluminum sulphate to coagulate the raw water. Two solution tanks, each 6 feet in diameter and 3 feet deep, will provide for storage of the solution. Each tank is provided with an agitator driven by a water motor. Accuracy in the application of the coagulant will be secured by the use of a cast iron, porcelain lined, constant head, adjustable orifice tank. The coagulant will be applied to the raw water at the inlet end of the coagulating basins. Provision is also made for applying coagulant to the effluent from the coagulating basins.

Coagulating Basins. Two coagulating basins of concrete construction with plain concrete walls and reinforced concrete roofs are provided. Each basin is 90 feet in length and 28 feet in width internal dimensions, and has a depth to the flow line of 15.5 feet. The basins are divided by longitudinal baffles so that the length of flow in each basin is 180 feet. At the entrance of the coagulating basins the water passes under a baffle and at the outlet the settled water is drawn off from the top of the basin over a skimming weir. A submerged baffle wall is also provided at the opposite end of the coagulating basins. The capacity of the coagulation basins is 585,000 gallons, which represents a retention period of 4.7 hours when the plant is operating at its nominal capacity of 3,000,000 gallons per twenty-four hours. This period is sufficient to secure proper coagulation and sedimentation. The floors of the coagulating basins are sloped to two longitudinal drains leading to a 10-inch sewer discharging into the lake near the present shore line.

Filters. Four rectangular concrete filter tanks placed in two rows of two units each are provided. The pipe gallery is situated between two rows of filters. The units are each 18 by 15 feet in plan and the total filter area is, therefore 0.025 acre. At a nominal rate of 125,000,000 gallons per acre per day the area is sufficient to provide a capacity of 3,000,000 gallons per day with an allowance for wash water. The filters will contain 34 inches of sand supported upon 8 inches of graded gravel. The strainer system will comprise a manifold to which will be connected lateral collectors provided with strainers of special type. Each filter will contain 924 strainers placed 6 inches on centers. A 4-inch air line is connected with a system of air laterals placed above the strainers in each unit. The wash water troughs are of unusual design, having an almost circular section and will be placed without a slope. The edge of the wash water troughs will be 2 feet above the top of the sand. The wash water troughs are constructed of riveted steel plates and two are provided for each unit. Wash water at 7 to 10 pounds pressure will be provided by a head tank of 11,000 gallons capacity. Washing of the filters will be accomplished by air and water pressure, the water being applied at a rate to produce a vertical rise of 2.5 feet per minute. The pipe gallery is 10 feet in width and 13.5 feet in height. The piping is so arranged that a free space 3 feet in width and 9 feet in height is provided for inspection and repair of the piping.

Control of the operation of the filters will be secured by providing loss of head gages, rate controllers, and rate of flow gages for each unit. The rate controllers will be of the Venturi tube type. An operating stand will be provided at each unit for the indicating gages and also for the operation of the valves. All valves will be hydraulically actuated.

Clear Water Basin. The effluent from the filters is collected in a 14-inch cast iron effluent line discharging into the clear water basin. This is a concrete structure 100 feet square in plan and 14.5 feet deep to the flow line. It is to be placed apart from the other structures of the purification plant and its roof will be under an earth fill 2 feet in depth. The side walls have a gravity section and the roof and floor are of a groined arch type, constructed of reinforced concrete. The inlet and outlet pipes are on opposite sides of the basin which will assist in securing good distribution. No drain or overflow is provided for the clear water basin. The capacity of the clear water basin is 1,000,000 gallons, representing a period of storage of eight hours on the basis of the nominal capacity of the plant. A 16-inch suction leads from the clear water basin to the high service pumps, paralleling the low service suction a portion of its length. A valved connection between the low and high service suction lines is provided by means of which raw water may be pumped into the mains. In view of the ample storage capacity of the clear water basin this connection is unnecessary and it must be considered an objectionable feature of the design.

Pumping Station Equipment. The following mechanical equipment will be installed: Two steam turbine, low lift centrifugal pumps of 3,000,000 gallons capacity each; one air compressor with a capacity of 1,000 cubic feet per minute; one crank and fly wheel pumping engine of 3,000,000 gallons capacity; one 1,000,000 gallon direct acting plunger pump reassembled; and two horizontal tubular boilers of 150 horse power capacity each. A coal bunker for the storage of fuel, reached by an incline, and a new stack will complete the mechanical features of the pumping station.

Superstructures. The present buildings will be largely removed, although portions of the walls will be retained as a part of the new structures. The filters and pumping station will be housed in buildings of brick construction and of pleasing architectural effect. A laboratory and office will be provided to facilitate proper superintendence of the plant.

SUMMARY.

In compliance with an order of the State Board of Health, the city of Painesville has proceeded to secure plans for a water purification plant to purify the existing unsatisfactory supply. The plans of the consulting engineer provide for a plant of adequate capacity to serve the city for twenty years or more. The general features of the plant are satisfactory and with proper operation the plant will produce a satisfactory purified effluent. In view of the generous design of the plant, it appears unnecessary to retain an emergency by-pass connection between the raw water suction and the clear water suction. This should be omitted.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, the detail plans for a proposed water purification plant for Painesville, received from Mr. R. Winthrop Pratt, consulting engineer for the city, June 23, 1913, were approved subject to the following conditions:

1st. That the proposed by-pass between the filtered water and raw water suction lines whereby raw water may be pumped into the mains shall be omitted;

2nd. That all grades of filtering material shall receive the approval of the engineer of the State Board of Health before being placed;

3rd. That the type of filter controlling and indicating apparatus shall be satisfactory to the engineer of the State Board of Health;

4th. That the city shall employ a competent analyst experienced in water purification to superintend the operation of the plant; and that the daily records of operation of the plant shall be submitted to the State Board of Health at monthly intervals; and,

5th. That this approval shall be void unless contracts for the installation of the plant shall have been awarded prior to October 1, 1913.

(These plans were submitted in compliance with an order issued by the State Board of Health under the Bense Act, April 13, 1913.)

REPORT ON PROPOSED IMPROVEMENT OF WATER SUPPLY AT RAVENNA.

On August 12, 1913, general plans for the improvement of the water supply at Ravenna, accompanied by a report of the director of public service and a resolution of the city council approving the plans, were received from Mr. W. H. Linton, director of public service. On August 15, 1913, the Chief Engineer visited Ravenna and investigated the proposed improvements. After an examination of the plans the following report was submitted:

Ravenna, a city with a population of 5,500, is located in Portage County on the divide between the watersheds of the Cuyahoga River and the Mahoning River. The drainage from the greater portion of the city reaches Congress Lake outlet, a tributary of the Cuyahoga River. The city is provided with a complete system of sewers and a sewage treatment plant and has municipally owned public water supply.

Present Water Supply. The public water supply was installed in 1885, and was originally obtained from Crystal Lake, located about one and one-half miles south of the city. The source of supply became inadequate and in 1888 Muzzy Lake, a natural reservoir located about one mile southwest of Crystal Lake, was selected as an additional source of supply. In 1895 an attempt was made to further increase the supply by installing four drilled wells near Crystal Lake. No extensions or additions to the supply have been made since 1895 and at the present time the wells are not in use. The supply is, therefore, obtained from Crystal Lake and Muzzy Lake, the latter furnishing almost the entire supply.

The water from Muzzy Lake is pumped through a 12-inch force main, discharging into a pump well in the station at Crystal Lake. An intake from Crystal Lake connects with the pump well so that the flow to the well may be from Muzzy Lake, from Crystal Lake, or from both, depending upon rates of pumping.

Crystal Lake is a small natural reservoir having an area of 24 acres, a maximum depth of 35 feet and an average depth of 18 feet. Its normal elevation is 1,078, while that of Muzzy Lake is 1,068. The drainage area of Crystal Lake is only 0.3 square mile. The water obtained from the lake is of objectionable quality, especially during the summer months when luxuriant algal growths develop and impart an objectionable taste to the water. Moreover, the available quantity is limited. This source of supply is not a valuable asset to the present works.

Muzzy Lake has a surface area of 68 acres, at normal elevation a maximum depth of 65 feet, and an average depth of 33 feet. Its drainage area is 1.4 square miles. It is probable that this lake is replenished largely from ground water, entering through its sides and bottom.

Both Crystal Lake and Muzzy Lake are exposed to the danger of pollution and the city maintains no legal jurisdiction to prevent accidental or deliberate pollution of its water supply. The land surrounding the lakes is owned by numerous land owners who exert their rights of riparian ownership to utilize the lakes. They are, therefore, misused for cattle watering, fishing, and in some cases for bathing. It is of the utmost necessity that the land surrounding the lakes be purchased by the city if they are retained as sources of supply. In spite of the poor surroundings of the supply the quality of the water has not been found dangerous, as evidenced by samples analyzed by the State Board of Health in 1904 and 1910. Moreover, the typhoid fever death rate has not been excessive.

The available quantity of the present supply is not sufficient for the needs of the city. Although the total available capacity of the lakes is not definitely known, it is probable that they can furnish not to exceed 1,200,000 gallons per day, without permanent lowering of the surface. The present water consumption of the city exceeds this figure slightly, and during dry weather the elevation of the lakes is noticeably lowered. It is of the greatest importance to the future growth of the city to secure an increased water supply.

PROPOSED WATER SUPPLY IMPROVEMENTS.

The plans and report of the director of public service provide for the development of an additional surface water supply, the construction of a water purification plant, and the installation of improved pumping machinery. These plans will be carried out as the financial condition of the city will permit, but it will be necessary to proceed with the general development gradually. It is proposed to immediately install improved pumping machinery to lift the water from Muzzy Lake to the Crystal Lake station and to pump the supply from that point to the city. The next step will be the development of an additional supply at which time a water purification plant will be installed. With the development of an additional supply Crystal Lake will be abandoned as a source of water supply. In order that each successive step may be in accordance with a general plan of development satisfactory to the State Board of Health it is desired to obtain approval of the general plan as submitted.

Proposed Additional Water Supply. The additional water supply will be obtained by impounding a tributary of the Congress Lake outlet which enters the main stream about three-fourths mile southwest of Muzzy Lake. This tributary is formed by the confluence of two small streams, known as the New Milford branch and County Ditch, respectively. The latter stream has its source about three miles south of Muzzy Lake at a point within one-half mile of the channel of Congress Lake outlet, at which point future diversion of the flow of the Congress Lake outlet is possible. It is ultimately proposed to develop the entire watershed thus artificially formed.

The New Milford Branch has a watershed area of 3.3 square miles and has a population of about 475, equivalent to 144 per square mile. New Milford with a population of about 125, and a portion of Rootstown with a population of about 100, are the only communities on the watershed. The remaining population is scattered in farm dwellings. The County Ditch has a watershed area of 4.9 square miles and a population of 295 or 60 per square mile of watershed area. With the exception of a portion of Rootstown the population is scattered in farm dwellings. Combined, the streams have a watershed area of 8.2 square miles, upon which there is a population of 770 or 94 per square mile of watershed area. This includes New Milford with a population of 125 and Rootstown with a population of 225. The pollution which will reach the streams regularly is small, though the likelihood of occasional intense pollution is apparent. This is particularly true as Rootstown is situated within one mile of the upper portion of the contemplated reservoir.

It is proposed to develop the supply by installing a dam across the stream a short distance above the confluence with Congress Lake outlet, which will raise the stream to elevation 1080. The dam will be 750 to 1000 feet in length and 15 feet high. The reservoir thus formed will have an area of approximately 160 acres, an average depth of 10 feet, and a capacity of 515,000,000 gallons. It is assumed that a supply of 2,800,000 gallons a day will be available from this reservoir. A gravity intake line will provide for drawing off the entire content of the reservoir. This line will convey the water by gravity into Muzzy Lake at such times as an additional supply is required at that point. At other times the flow of the stream will be wasted over the spillway.

The development of the Congress Lake outlet as an additional source of water supply will be contingent upon the needs of the city. An unusual condition exists in the proximity of the headwaters of the County Ditch to the main channel of the Congress Lake outlet, which condition makes possible a diversion at low cost of the flow of the latter stream. This will be accomplished by the construction of a low dam, five feet high, impounding the water to elevation 1090, which will give sufficient head to convey the water by pipe or flume to the County Ditch waterhead and thence to Muzzy Lake. Above the proposed dam Congress Lake outlet has watershed area of 37.1 square miles. It rises at Congress Lake a natural reservoir, having an area of about 260 acres and flows in a general northerly direction to the Cuyahoga River. The population upon this portion of the Congress Lake watershed is about 2,600, equivalent to 72 per square mile of watershed area. The population is principally in scattered farm dwellings there being but three small communities, Randolph, New Baltimore, and St. Joseph, which have populations of 450, 170, and 100, respectively. At Congress Lake a small amount of sewage reaches the stream from a recently constructed club house, but this pollution will probably be corrected in the near future by the installation of a sewage treatment plant. There is no other regular pollution reaching the stream. Relative to the capacity available in the development of the Congress Lake outlet, it is assumed that the minimum flow will be 2,000,000 gallons per day, equivalent to 0.084 second foot per square mile of watershed area, which volume may be diverted to Muzzy Lake. Future installation of storage reservoirs at various points on the watershed will provide for extensive development in the available quantity from this source.

Proposed Water Purification Plant. No detail plans have been prepared for the proposed water purification plant, and only the general features have been considered. It is tentatively proposed to install a plant of the gravity, rapid sand type, with a capacity of 3,000,000 gallons. The plant will be located near the Crystal Lake pumping station and will receive the discharge from Muzzy Lake. An experimental water purification plant is now being operated to determine the feasibility of coagulating and purifying the water of Muzzy Lake.

Improved Pumping Machinery. As an immediate step in the general improvement of the water supply it is proposed to install new pumping machinery at the Muzzy Lake and Crystal Lake stations. At Muzzy Lake a new fire proof building is to be constructed to house three motor driven centrifugal pumps of 2,000 gallons per minute capacity, operating against a head of 50 pounds; the elevation of the pumps will be 1,060 or 8 feet below the normal elevation of Muzzy Lake. A new intake will be located to draw water at an elevation 1,050 or 18 feet below the normal elevation of the lake. Two of the pumps will be installed immediately and arranged to operate in series or in parallel.

In drawing water through an intake 18 feet below the surface of the lake it is probable that an appreciable quantity of ground water will be pumped. Past experience has shown that following lowering of the lake to elevation 1066, subsequent lowering does not occur. With the pumping of large percentages of cold, clear, ground water, coagulation will be extremely difficult. This possibility will be studied in the operation of the experimental filter. It may be necessary and advisable to entirely divert the proposed additional surface supply to Muzzy Lake, constructing a new spillway at the lake to discharge the overflow to the Congress Lake outlet.

At the Crystal Lake station it is proposed to install two motor driven, centrifugal pumps with a capacity of 2,000 gallons per minute, operating against a head of 80 pounds. These pumps will operate in series or in parallel, with themselves, or in series with the Muzzy Lake pumps. The control of all motors to operate the pumps will be at the Crystal Lake station, which will obviate additional supervision at the Muzzy Lake station. With the development of the additional water supply and the installation of a water purification plant, the proposed pumps at Muzzy Lake station will serve as low lift units and those at the Crystal Lake station will take their suction from the clear well of the water purification plant.

SUMMARY.

The city of Ravenna has formulated a comprehensive general plan for future development of a water supply for the city. The plan may not be completely carried out for a number of years, although it is apparent that within the next few years an additional water supply will be necessary. With the development of an additional surface supply it will be necessary to provide a water purification plant to protect the health of the city. This is fully realized by the city and is included as a feature of the general improvement.

The present conditions surrounding Muzzy Lake, which it is proposed to retain as a source of supply, or large collecting reservoir in the ultimate development, are extremely bad, and can be improved only by purchase by the city of the land surrounding the lake. This should be done immediately and as a first step in the comprehensive development. The control of Crystal Lake is not so important, inasmuch as it will be abandoned.

The possibility of failure to secure efficient purification of water obtained from Muzzy Lake at a depth of 18 feet below the surface should be recognized before any important development is made. This question may be studied to advantage in the operation of the experimental plant at Ravenna.

ACTION OF THE BOARD.

At a meeting held September 2, 1913, the State Board of Health considered the general plans for proposed improvement of the public water supply at Ravenna, received from W. H. Linton, director of public service, August 12, 1913, providing (a) enlargement of the supply by utilizing the flow of the New Milford branch, the County Ditch, and the Congress Lake outlet (so-called), and (b) the installation of a water purification plant and improved pumping machinery.

These general plans were approved upon the following conditions:

1st. That prior to June 1, 1917 (a) contracts for the development of the New Milford branch and County Ditch (so-called) and for the installation of a water purification plant shall have been awarded, and (b) all property surrounding and lying within 100 feet of the high water elevation of Muzzy Lake shall have been purchased if the lake is retained as a source of supply; and,

2d. That before contracts for the development of an additional supply and installation of a water purification plant are awarded, and prior to January 1, 1917, detail plans for the improvements shall have been submitted to and received the approval of the State Board of Health.

The director of public service was advised that the practicability of purifying by coagulation and rapid sand filtration the water obtained from Muzzy Lake at elevation 1050 should be determined before detail plans are prepared in accordance with the general plans and report received from him August 12, 1913.

REPORT ON PROPOSED WATER PURIFICATION PLANT FOR ROSSFORD.

On March 4, 1913, general plans for a proposed water purification plant for Rossford were received from Mr. C. L. Lewis, secretary of The Edward Ford Plate Glass Company at Rossford. The plans were referred to the engineering department and on March 6, 1913, one of the assistant engineers visited Rossford and examined the proposed improvements. After a review of the plans the following report was submitted:

Rossford is an unincorporated community with an estimated population of 2,000, located in Wood County opposite the city of Toledo. The community owes its development to the plant of The Edward Ford Plate Glass Company, and the population consists largely of employes of that company. A public water supply has been installed by the company and also a partial system of combined sewers. These improvements have been made without the knowledge or approval of the State Board of Health.

EXISTING WATER SUPPLY.

The public water supply was at first obtained from drilled wells which became inadequate to supply the growing population. The company had already installed an intake into the Maumee River to obtain water for industrial use and as the well supply became inadequate the river was depended upon as an emergency supply. At the present time the supply is obtained partly from the wells and partly from the river, and an examination made January 7, 1913, by a representative of the State Board of Health showed that the water furnished the consumers was of dangerous character. The supply is used generally throughout the community and the consumption for domestic purposes is about 360,000 gallons per day.

PROPOSED WATER PURIFICATION PLANT.

Following the advice of the State Board of Health the company intends to abandon the drilled wells and to obtain the entire supply from the Maumee River, installing a purification plant to improve the quality of the raw water. At the present time the company has in operation a water softening plant installed by The Wm. B. Scaife & Sons Company, which has a capacity to treat 450,000 gallons per day for boiler purposes. This plant in brief consists of two reaction and settling basins of 30,000 gallons capacity each operated on the fill and draw basis, two mechanical filter units each of 226,000 gallons daily capacity, and a clear well of 6,900 gallons capacity. The plans prepared by The Wm. B. Scaife & Sons Company provide for extending the industrial softening plant by the addition of a reaction and settling basin and a filter unit and a clear well. Although the filter unit and clear well are shown to be independent of the industrial filters and clear well, the influent to the filters may be taken from any of the three reaction and settling basins.

Settling Basins. The raw water will be pumped into any of the three settling basins where it will be treated with lime and soda ash, agitated mechanically to complete the reactions and allowed to settle before being drawn off to the filters through a float-controlled outflow. The sedimentation capacity available is 90,000 gallons, although it should be noted that 60,000 gallons of this capacity will be utilized for softening boiler water. The net capacity available, therefore, is 30,000 gallons, representing two hours period on the basis of 360,000 gallons daily consumption. This period will be utilized for filling the basin, treating the water and completing the reactions and settling. It is obviously inadequate.

Filter. The plans for a filter which will be used to purify the water supply for the community provide for a tub filter 10 feet in diameter with an area of 79 square feet. The capacity is, therefore, 226,000 gallons per day when operated at a rate of 125,000 gallons per acre per day. The details of the filter are in all respects similar to the usual type installed by The Wm. B. Scaife and Sons Company, and need not be discussed at length at this point. The area, it will be noted, is inadequate to supply the village even if operation is constant during 24 hours each day. The provision of a single unit does not provide for a constant supply of filtered water in event of an interruption of operation of that unit.

Clear Well. The clear well beneath the filter is 11 feet by 14 feet in plan and 3 feet deep providing a storage capacity of 3,500 gallons. This storage capacity will necessitate constant operation of the filters as it represents only 15 minutes period of storage with the pumpage at the rate of 360,000 gallons per day. Varying rates of pumpage will, therefore, necessitate varying rates of filtration, and any unusual demand of water as for fire protection will necessitate the use of raw river water. Additional storage on the distribution system will be provided by the installation of an elevated tank of 50,000 gallons capacity. Plans for this portion of the improvement have not been submitted.

SUMMARY.

From the foregoing it will be noted that while The Edward Ford Plate Glass Company is making an effort to improve the water supply of Rossville, they have submitted plans which do not provide for a plant of adequate capacity for the needs of the community. The settling, filtering, and clear well capacity are all deficient. The plant moreover is of identical type to that already installed for industrial uses, and it is probable that the definite purposes of water softening and water purification will be confused which will lead to improper operation of the purification plant. It would be advisable that the company install a water purification plant for the community to be constructed and operated entirely independent of the industrial plant with a view to securing the highest degree of hygienic purity.

The plans submitted by the company are insufficient in detail and do not show general features which are necessary for intelligent criticism. Plans for the distribution system and its improvement and also the piping adjacent to the existing and proposed plant should be submitted.

ACTION OF THE BOARD.

At a meeting held March 20, 1913, the State Board of Health withheld approval of the plans for a proposed water purification plant for Rossford; received from Mr. C. L. Lewis, secretary of The Edward Ford Plate Glass Company, on March 4, 1913.

The Secretary was instructed to inform The Edward Ford Plate Glass Company that the respective problems associated with treatment of water for industrial use and treatment of water to improve its sanitary quality are not identical and the solutions are not arrived at in exactly the same manner. A plant for the treatment of a public water supply to prevent disease must be of somewhat different design and must be operated with more particular attention to certain features than is the case with an industrial softening plant. Therefore, it is advisable that a plant for the purification of the water supply of Rossford should be designed with the purpose of producing the highest possible efficiency from a sanitary standpoint, and such a plant should preferably be built and operated entirely independent of an industrial softening plant.

The Secretary was also instructed to notify The Edward Ford Plate Glass Company that in the opinion of the Board the plans received March 4, 1913, do not provide sufficient settling, filtering and clear well capacity, and that a satisfactorily purified effluent at all times is not assured; and that revised general and detailed plans should be prepared and submitted to the State Board of Health.

REPORT ON PROPOSED NEW WATER SUPPLY FOR ROSSFORD.

On June 21, 1913, plans for a proposed new water supply for Rossford were received from The Edward Ford Plate Glass Company of Rossford, which company will install the supply. On May 28, 1913, prior to the submission of the plans one of the assistant engineers visited Rossford and investigated the proposed improvements. After an examination of the plans the following report was submitted:

EXISTING WATER SUPPLY.

The supply is used for general purposes throughout the community. and the daily consumption is approximately 360,000 gallons. The distribution system comprises about 6,200 feet of 4-inch and 6-inch pipe and covers practically the entire area of the community. The water supply for drinking purposes at the plant of The Edward Ford Plate Glass Company is obtained from a drilled well (well No. 1) and pumped through a distribution system which is not connected with that of the community.

ACTIONS OF THE BOARD.

The existence of the water supply at Rossford was brought to the attention of the State Board of Health in October, 1912, and subsequent to an examination of the supply in January, 1913, the company was advised that it was of unsatisfactory quality and that a new supply should be secured. Following this advice on March 4. 1913, The Edward Ford Plate Glass Company submitted plans for a water purification plant to purify the Maumee River water. Owing to certain undesirable features in these plans the Board withheld approval of them in an action taken March 20, 1913. Subsequently, The Edward Ford Plate Glass Company decided to abandon the project of installing a water purification plant and adopted the development of a ground water supply.

PROPOSED NEW WATER SUPPLY.

The plans for the proposed new water supply provide for the installation of four new drilled wells, (wells Nos. 3 to 6) three of which will be placed in use immediately. The development will include provision for pumping the wells by air lift, a collecting well, a service pump. an elevated tank, and a connection with the existing distribution system.

Source of Supply. The proposed new wells will be located in the westerly portion of the property of The Edward Ford Plate Glass Company, about 1,000 feet south of the Maumee River. The wells are so located that the average distance between them is 300 feet. The wells will be drilled to a depth of 500 feet, and will be cased to the rock formations which are encountered approximately 100 feet below the surface. The water supply is obtained entirely from the porous limestone formations. The location of the wells is satisfactory as regards the proximity of sources of pollution, as there are no buildings excepting those of The Edward Ford Plate Glass Company within 1,000 feet. The plans show insufficient detail of the development of the wells and additional plans are necessary. Existing wells Nos. 1

and 2 will be retained as a possible source of water supply, although they will not be placed in service immediately.

Quantity of Water. No tests have been made to indicate the quantity of water available from the limestone formations. Evidences of the yield of the existing well would indicate that the development of four new wells will produce a sufficient quantity. However, it may be necessary to install additional wells from time to time.

Quality of Water. The quality of the water supply is indicated by the results of analyses of samples taken from the existing supply well January 7, 1913, and from one of the proposed new supply wells May 28, 1913. The results of the analyses indicate that the water is of satisfactory quality from a sanitary standpoint and only slight evidences of organic pollution are shown. The physical characteristics of the water are satisfactory but the hardness is such as to make it objectionable for many purposes. The iron content is satisfactory.

Development of Supply. The plans for the development of the supply provide for the installation of an air lift apparatus for discharging the water from the wells. The discharge pipes will be carried to a collecting well or to a gravity conduit leading to a collecting well. The plans are insufficient in this detail. The collecting well, circular in plan, is a covered reinforced concrete structure of 50,000 gallons capacity. The water from the collecting well will be pumped into an elevated tank by an electrically driven triplex pump with a capacity of 1,500 gallons per minute. The elevated tank is of wooden construction and covered, and has a capacity of 50,000 gallons. So far as the plans show, the development of the water supply is satisfactory.

Emergency Supply. To provide fire protection for the community it is proposed to establish valved connections by means of which the raw Maumee river water may be pumped into the distribution system. In view of the necessity of adequate fire protection, this practice is warranted, but the utmost care must be exercised to prevent accidental contamination of the supply by this means. The supply from the existing well is pumped by a so-called fire pump, the suction of which has a valved connection with a reservoir supplied with raw river water. The operation of this pump in pumping well water introduces the danger of contamination of the supply by leakage through the valve on the suction line. If this well is to remain in service an independent pump should be provided.

To control the use of the emergency supply the valves connecting this supply with the distribution system should be placed in boxes provided with locks and keys which should be retained by an officer of The Edward Ford Plate Glass Company, and by the health officer of Rossford.

SUMMARY.

The community of Rossford is at present provided with a water supply obtained in part from a drilled well and in part from the Maumee River. The Edward Ford Plate Glass Company, which operates the existing supply proposes to install a new supply to be derived entirely from drilled wells. This supply is of satisfactory sanitary quality and its development according to the plans submitted is in general satisfactory. Additional details of certain features are required.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the proposed new water supply for Rossford to be obtained from drilled wells, approximately 500 feet deep, located on the present property of The Edward Ford Plate Glass Company, and to be developed according to plans submitted by that company June 21, 1913, was approved subject to the following conditions:

1st. That detailed plans, satisfactory to the Engineer of the State Board of Health, showing the proposed well development including devices for pumping the wells and method of conveying the water to the collecting well, shall be submitted to the State Board of Health;

2nd. That well No. 2 shall not be used as a source of water supply unless provision is made by an independent pump, or otherwise, to prevent the contamination of the well supply by river water in the process of pumping;

3rd. That all valves on connections between the distribution system and the emergency supply from the Maumee River shall be placed in substantial boxes provided with locks, the keys for which shall be retained by a dependable employe of the Edward Ford Plate Glass Company, and by the health officer of Rossford; and,

4th. That this approval shall be void unless revised detailed plans showing the above mentioned features shall have been submitted to the State Board of Health prior to August 1, 1913, and the equipment shall have been provided in accordance with such plans prior to November 1, 1914.

STATEMENT RELATIVE TO EXTENSION OF WATER SUPPLY INTAKE AT SANDUSKY.

On May 13, 1913, general plans and an estimate of cost for the extension of the water supply intake at Sandusky were received from Mr. Robert L. J. Wagar, chief engineer, department of public service. No request for approval of these plans was submitted as the city council has not decided to make the improvement specified. The plans and estimates were examined by the engineering department and the following report was submitted:

The State Board of Health has constantly discouraged the discharge of untreated sewage into the Sandusky Bay and the use of Sandusky Bay as the source of water supply for the city. Since 1906, when the Board approved of the proposed sewer to discharge at the foot of Warren Street, plans for additional sewerage for the city have been disapproved or approved contingent upon the extension of the water supply intake. In the various actions of disapproval and conditional approval, the Board has called attention to the dangers incident to the discharge of untreated sewage into Sandusky Bay and the use of the bay as a source of water supply. A conditional approval of proposed additional sewerage granted October 23, 1912, provided that plans for an extension of the water supply intake should be submitted to the State Board of Health.

Relative to the water supply of the city it will be recalled that a water purification plant was installed in 1908 to purify the water obtained from the bay through the old intake. The construction of this plant was faulty and it failed to satisfactorily solve the water supply problem of the city. In 1912 plans for a comprehensive improvement of the filter plant incurring an expense of $120,000, approximately equal to the original cost of the plant, were submitted to and conditionally approved by the State Board of Health. In this approval it was provided that a design and estimate of cost for a water works intake to a suitable location in Lake Erie should be submitted.

The local council has decided to improve conditions attending the disposal of the sewage of the city and in this way to reduce the pollution of Sandusky Bay before undertaking an extension of the water works intake. Plans which were submitted May 13, 1913, provide for the ultimate collection of the sewage flow at a treatment plant in the extreme northwestern portion of the city far removed from the water works intake where clarification and disinfection of the sewage will take place. At the present time there is under construction the entire rebuilding of the water purification plant which should make possible the production of a well purified effluent at all times. The removal of pollution from the Sandusky Bay will no doubt improve the character of the raw water. It may be entirely possible, therefore, though not an ideal solution, to retain Sandusky Bay as a receptacle for treated sewage and as a source of water supply for the city for several years. This condition, however, cannot be maintained permanently and extension of the water works intake to Lake Erie will ultimately be required.

The plans submitted May 13, 1913, provide for the installation of a new intake line extending in a northeasterly direction 18,300 feet, or 3.46 miles, from the water purification plant. The new intake line will cross Sandusky Bay and the neck of land connecting the mainland with

Cedar Point, and will extend 1¾ miles into Lake Erie where the depth of water is 28 feet. The line will be constructed of 48-inch cast iron pipe and the water will be taken at an elevation 8 feet above the bottom of the lake through three, 36-inch intakes connecting to a special 36 by 48-inch tee. The estimate of cost of the extension submitted by the city engineer is $375,000 which would be an excessive expenditure for the city.

It would appear that the State Board of Health should permit and encourage the early completion of the proposed sewerage improvements and advise the city that the question of the necessity of an extension of the water works intake will be held in abeyance until the improvement of the water purification plant, and the installation of intercepting sewers, and sewage treatment works, shall have been completed.

ACTION OF THE BOARD.

At a meeting held June 26, 1913, the State Board of Health decided to hold in abeyance the question of the necessity of an extension of the water works intake at Sandusky until the improvement of the water purification plant and the installation of intercepting sewers and sewage treatment works shall have been completed.

The Board voted to accept the plans and estimates of cost for the extension of the intake to a location in Lake Erie, received from Mr. Robert L. J. Wagar, chief engineer, department of public service, May 13, 1913, and submitted to comply with conditions imposed by the State Board of Health in actions taken June 19, 1912, October 23, 1912, and November 21, 1912.

REPORT ON GENERAL PLANS FOR PROPOSED WATER PURIFICATION PLANT FOR STEUBENVILLE.

On June 26, 1913, general plans for a proposed water purification plant for Steubenville, prepared by Messrs. Chester and Fleming, consulting engineers, were submitted by Mr. D. S. Sinclair, member of a water commission appointed by the mayor to advise the city council relative to an improvement of the water supply of the city. Accompanying the plans was a communication from the clerk of council, stating that the plans had been approved by that body. The plans were referred to the engineering department and on July 10, 1913, the chief engineer visited Steubenville and investigated the proposed improvements. The following report was submitted:

Steubenville, a city with a population of 25,000, is located in Jefferson County on the Ohio River about 63 miles below Pittsburg. The city extends 3½ miles along the river, the main portion being on a terrace above the high water elevation of the river. The residential districts of the city also extend into the hills which rise to a height of about 325 feet above the river.

The water supply of the city was installed in 1810, being one of the oldest supplies in the country. The supply has always been obtained from the Ohio River and furnished without treatment to the consumers. The sewage of the city is constructed entirely on the combined plan and discharges into the Ohio River and into Wells Run through numerous outlets. The most northerly outlet is one mile below the water works intake.

EXISTING WATER SUPPLY.

In 1894 the water works equipment of the city was considerably improved. The old intake and pumping station opposite the central portion of the city was abandoned and a new intake and pumping station installed at a point about one-half mile above the northerly corporation line of the city. The supply is now obtained through two 24-inch intakes from the West Virginia side of the river, discharging by gravity into a well on the Ohio shore, from which the suction of the pumps is taken. Two 3-million gallon vertical duplex pumps installed in 1895 are used to pump the supply. A new 6 million-gallon unit is to be installed in the near future. The water is discharged through a 20-inch rising main into a high service reservoir located in the extreme northeasterly portion of the city. This reservoir is 1.5 miles south of the pumping station and at an elevation 312 feet above the pumps. The reservoir is constructed in excavation 270 by 220 feet in plan and 20 feet deep, and has a capacity of 5.5 million gallons. The sides are lined with masonry and the bottom is covered with rip rap. From the high service reservoir a portion of the supply is pumped to an elevated residential district, storage for which is provided by a standpipe of 140,000 gallons capacity. The greater quantity from the high service reservoir flows through a 20-inch main supplying an independent high pressure fire service distribution system in the central portion of the city. From this main a 12-inch branch discharges to low service reservoirs located in the south-central portion of the city. The flow into the low service reservoirs is controlled by float valves. These reservoirs are constructed in excavation and have a combined capacity of 2,700,000 gallons. One of the reservoirs is built of masonry, while the other is in earth excavation. At the time of the examination the latter reservoir was in a filthy condition. From the low service reservoirs the main portion of the city is supplied, the pressure secured being about 40 pounds. A few mains and service connections are also taken from the 20-inch high pressure main leading from the high service reservoir.

The water supply of the city is used by almost the entire population. The consumption varies from 3 to 5 million gallons per 24 hours, and averages about 4 million gallons. The high per capita consumption indicates gross waste of the supply.

The quality of the present water supply is unquestionably bad. The Ohio River above Steubenville has a watershed area of over 25,000 square miles and receives sewage from several large centers of population. The Pittsburg district probably contributes the most intense pollution, although within 25 miles from Steubenville important sewage pollution within the state of Ohio reaches the river. The typhoid statistics are an index of the poor quality of the supply. The deaths from 1909 to 1912 were 15, 13, 10, and 14, respectively, and the average death rate per 100,000 population for that period was 57.7. The necessity for an improved water supply is apparent.

PROPOSED WATER PURIFICATION PLANT.

The general plans of the consulting engineers for improvement of the water supply provide for the installation of a water purification plant of the gravity rapid sand type, to be located near the existing high service reservoir. It is planned to maintain the present pumping station, lifting the raw water to the purification plant, from which it will discharge by gravity into the present high service reservoir, and thence to the distribution system. The water purification plant will have a capacity of 6 million gallons per 24 hours, which will be sufficient to serve the city for a number of years. Its main features comprise a primary sedimentation basin, a coagulation basin, filters, and a clear water basin.

The location of the water purification plant as selected will necessitate regularity in the operation of the raw water pumps to secure uniformity in the operation of the purification plant. It will probably be impossible to secure regular rates of pumping, and it may be expected that at times the rates will be greatly in excess of the capacity of the plant.

Primary Sedimentation Basin. In order to remove the heavy suspended matter which is present in the Ohio River water during all but low stages of the stream, a primary sedimentation basin is to be provided. This is an open reinforced concrete structure 50 feet by 83 feet 4 inches in plan and 15.5 feet in average depth. The direction of flow is across the smaller dimension. Its capacity is 483,000 gallons, which provides a retention period of 1.9 hours. This period is sufficient to remove the heavier suspended matter but will not remove the finely divided silt. The inlet of the basin is of special construction to secure aeration and good distribution of the raw water. The 20-inch raw water main discharges into a 24-inch inlet line extending along one side of the bottom of the basin, from which eight equidistant riser pipes extend to a point about 3 feet above the flow line. The water falls to splash plates at the flow line. The outlets at the opposite side of the basin are similarly constructed, but the risers extend only to the flow line. The bottoms of the basins are sloped to a channel to provide removal of the sludge. Provision is made for coagulating the raw water before its entrance to the primary sedimentation basin, so that this basin can be utilized as a coagulation basin in emergency. The primary basin may also be by-passed and the raw water discharged directly to the coagulation basin.

The effluent from the primary basin enters a mixing chamber at the inlet of which the coagulant will be normally applied. The mixing chamber extends along one end of the primary basin and is 50 feet in length, 5 feet in width, and has a depth of 15 feet. The velocity of flow through the mixing chamber is 20 feet per minute, which will prevent the deposition of the coagulant.

Coagulation Basin. The coagulation basin which adjoins the primary basin is an open reinforced concrete structure 90 feet square in plan and 16 feet in average depth to the flow line. It is divided into two compartments by a baffle wall extending longitudinally from one side of the basin to a point 15 feet from the opposite side. The details of the baffling of the basin are not satisfactorily shown. The inlet ends are provided with a main and riser pipes similar in construction to those of the primary sedimentation basin. The capacity of the coagulation basin is 960,000 gallons, providing a period of retention of 3.8 hours based on the nominal capacity of the plant. Provision is made for by-passing the coagulation basin to convey the effluent from the primary basin to the filters. By this connection also raw water may be discharged directly to the filters. The possibility of this occurrence could be avoided. This may be accomplished by installing an independent connection between the raw water main and the inlet of the coagulation basin and providing a check valve in addition to the gate valve on the inlet line to the coagulation basin shown on the plans. The sludge from the coagulation basin will be removed by means of a central channel discharging into a sewer.

Filters. The plans provide for six units of filters constructed of reinforced concrete, rectangular in plan and 350 feet in area each. The total area is, therefore, 0.05 acre, which is sufficient to provide a proper rate for filtering 6 million gallons per 24 hours with allowance for wash water. The filtering material will comprise 30 inches of sand resting upon 10 inches of graded gravel placed around and above the strainer system. The strainer system is of special construction, consisting of ½-inch brass piping, set vertically 6¼ inch on centers both ways, extending through a concrete false bottom 8 inches in thickness. Below the false bottom is a space 20 inches in depth. In operation the clear water will pass into the open space below the false bottom and thence through the effluent line to a clear well. The wash water troughs are placed with their edges 30 inches above the sand line, and it is proposed to utilize a hard wash with a vertical rise of 2.5 feet per minute. Ten mesh brass screening will be placed between the sand and gravel layers.

A wash water tank will be placed on a hill nearby to supply pressure for washing.

The operation of the filters will be regulated by rate controllers of the Venturi type, and indicating rate of flow and loss of head gages will also be provided. An operating stand is provided at each unit, where all valves hydraulically actuated may be set. The pipe gallery between the filters is generously designed to provide ease of inspection and repair of the piping. A clear space 7 feet wide and 6 feet high, gives ample room for this purpose.

Wash Water Recovery. A novel feature of the design is the provision of a basin for the sedimentation and recovery of the wash water from the filters. It is proposed to pump the settled wash water to the inlet of the primary sedimentation basin and thus introduce it into the raw water supply. The wash water enters the same sewer which receives the sludge from the sedimentation and coagulation basins. This sewer parallels a sewer receiving wastes from plumbing fixtures within the filter building, but the sewers are not connected above the recovery tank. The economy of the process is not of sufficient importance to allow the danger of undue contamination of the raw water to occur. The wash water from the filters is primarily a dirty, polluted water, and in itself is inferior to the raw water. Furthermore, its discharge through a sewer paralleling a sanitary sewer introduces the danger of serious contamination either by leakage or a possible future connection of the sewers. The proposed process of wash water recovery should not be permitted.

Clear Water Basin. In addition to the clear water storage provided by the high service reservoir, a clear water basin is provided in the design, to be placed immediately beneath the filters. It covers the same area as the filters, its walls being extended to serve as the end walls of the filter units. The clear well consists of two sections, one on either side of the pipe gallery, each 20 feet 10 inches by 61 feet 7 inches in plan and 6 feet in depth. The capacity thus afforded is 56,000 gallons. This clear well will serve as a suction well for the wash water pumps and will provide storage of filtered water should the high service reservoir be thrown out of service.

The high service reservoir, which will be utilized for clear water storage, has a capacity of 5.5 million gallons, which is equivalent to 22 hours' storage based on the nominal capacity of the plant. Although the reservoir is paved it is not provided with a cover and the filtered water will, therefore, be exposed to the direct rays of the sun. It is probable that trouble will be experienced due to algal growths in this reservoir. Additional filtered water storage of 2.7 million gallons is also provided by the existing low service reservoirs which it is proposed to continue in service. One of the low service reservoirs is totally unfit for use as a receptacle for filtered water, inasmuch as it is not provided with a proper lining or cover. The other reservoir, which is of masonry construction, may be properly utilized if it is provided with a cover.

Superstructures. The buildings to house the filters and pumping equipment are designed with pleasing architectural effect and add to the general appearance of the surroundings. An office and laboratory completely equipped will be provided to facilitate the operation of the plant.

SUMMARY.

The general plans for improvement of the water supply of Steubenville provide a water purification plant of sufficient capacity and with proper essential devices to produce a satisfactory water supply for the city. There are, however, certain criticisms which should be made in the general design and details. The location of the plant at the high service reservoir is undesirable for several reasons. The principal objection is that the rate at which the raw water will be received at the plant will not be uniform or even controllable by the operator, but will be dependent upon the operation of the pumps at the main station. In addition, the pumping of raw water under such great pressure is uneconomical. By-pass facilities by means of which the raw water may be applied to the filters are distinctly objectionable. The primary basin should be provided with shallow hanging baffles to prevent stratification of the flow. Details of baffling of the secondary basin are inadequate. The wash water recovery process is an undesirable feature and may introduce excessive contamination of the raw water. The general plans omit several details necessary for a thorough examination. While the main features of the general plans are satisfactory, detail plans should be prepared incorporating revisions to obviate the foregoing criticisms.

Attention is also directed to the necessity of improving the existing distributing reservoirs to serve as receptacles for filtered water. The advisability of covering the reservoirs and otherwise improving them should be considered.

ACTION OF THE BOARD.

At a meeting held July 23, 1913, the State Board of Health approved these general plans for a proposed water purification plant for Steubenville, prepared by Messrs. Chester and Fleming, consulting engineers, and submitted June 26, 1913, by Mr. D. S. Sinclair, representing the council of the city of Steubenville, subject to the following conditions:

1st. That before contracts for the installation shall have been awarded detail plans incorporating revisions in design satisfactory to the State Board of Health shall be submitted to and receive the approval of the State Board of Health; and,

2nd. That this approval shall be void unless the aforesaid detail plans shall have been submitted prior to December 1, 1913.

The Secretary was instructed to advise the local authorities and their engineers that the foregoing action of the Board was an approval of the general features of the proposed water purification plant, and that approval of its location and details of design would be held in abeyance pending the submission of complete detail plans.

The Secretary was also instructed to advise the authorities that in conneciton with the preparation of detail plans, the improvement of the existing distributing reservoir should be considered. As one of the low service reservoirs was unfit to serve as a receptacle for filtered water, and in order to prevent the development of algal growths, it might be necessary to provide covers for all of the reservoirs used.

On August 5, 1913, revised general plans for a proposed water purification plant for Steubenville were received from Messrs. Chester and Fleming of Pittsburg, consulting engineers for the city. Prior to the submission of the plans the Chief Engineer visited Steubenville on July 25, 1913, and investigated the contemplated general arrangements of the plant. The following report was submitted:

REVISED GENERAL PLANS FOR WATER PURIFICATION PLANT.

The revised general plans provide for the installation of a six-million gallon water purification plant of the gravity rapid sand type, to be located near the existing high service reservoir. The present pumping station on the Ohio River will be maintained and the raw water will be discharged into existing high service reservoir, as at present, from which it will flow to the proposed water purification plant. A connection to the distribution system will be made with the clear water basin of the proposed plant. The general location of the plant, as selected, is much more satisfactory than that provided in the original general plans, considered by the Board July 23, 1913. The only objection to the selected location is the wear on the pumps at the Ohio River station, due to the fact that they operate with water carrying large quantities of suspended matter. A more logical location for the plant would have been secured at or near the site of the present pumping station but this was found to be impracticable, due to excessive costs of construction, which would have been occasioned. The discharge of raw water to the high service reservoir provides for fluctuations in rates of pumping without affecting the rates of operation of the water purification plant. Moreover, this method of development will provide for the utilization of the existing high service reservoir as a primary sedimentation basin and thus a storage period of more than 24 hours will be provided to assist in clarifying the river water. The result will be that the water purification plant proper will be relieved of the heavy burden of treating in its raw state the turbid Ohio River water.

The general plans include utilization of the high service reservoir, as mentioned, and the installation of a coagulation basin, filters, and clear well.

Primary Sedimentation Basin. The existing high service reservoir, which will be used as a primary sedimentation basin, is an open receptacle, constructed in excavation and fill, 270 by 220 feet in plan and 20 feet deep, and has a capacity of 5.5 million gallons. This is equivalent to 22 hours storage, based on the nominal capacity of the water purification plant. On opposite sides of the basin, specially constructed inlet and outlet distribution pipes will be provided. This will insure good displacement in the passage of the water through the reservoir.

Coagulation Basin. The settled water from the primary basin, after being treated with the coagulant, will enter the coagulation basin where a large remaining portion of the suspended material will be removed. The coagulation basin is an open, rectangular, reinforced, concrete structure about 135 by 90 feet in plan and 16 feet in depth to the flow line. Its capacity is, therefore, 1,458,000 gallons, which represents a period of flow of 5.8 hours, based on the nominal capacity of the plant. The basin is divided longitudinally into two portions by a concrete baffle wall, across the end of which the flow takes place. The inlet and outlet ends are provided with specially constructed distributers to secure good displacement.

Filters. The filters are constructed in six units, each 350 square feet in area. They are in all respects similar to the original design. The total area is sufficient to provide a proper rate for filtering 6,000,000 gallons per 24 hours with allowance for wash water. The details of the design of the filters will be shown in plans to be prepared.

Wash Water Recovery. Owing to the excessive elevation of the plant with respect to the Ohio River, and the consequent cost of pumping the raw water to the filter plant, it is proposed to recover by sedimentation the wash water from the filters. To provide this feature a sedimentation tank and automatic, electrically driven pump will be provided. The details of this feature will also be shown in future plans.

Clear Water Basin. The effluent from the filters will be stored in a covered reinforced concrete clear water basin 187.5 feet by 89 feet in plan and 16 feet in depth. The capacity for storage of filtered water is, therefore, 2,000,000 gallons, representing eight hours storage on the basis of the nominal capacity of the plant. This storage is sufficient to provide for ordinary interruptions in the operation of the plant.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held September 2, 1913, the revised general plans for a proposed water purification plant for Steubenville, received August 5, 1913, from Messrs. Chester and Fleming, consulting engineers for the city, were approved subject to the following conditions:

1st. That before contracts for the installation shall have been awarded, detail plans of the proposed water purification plant shall be submitted to and approved by the State Board of Health; and,

2nd. That this approval shall be void unless the aforesaid detail plans shall have been submitted prior to January 1, 1914.

The Secretary was instructed to advise the local authorities that the foregoing action of the Board was an approval of the location and general features of the proposed water purification plant and that the approval of the details of design would be held in abeyance pending the submission of complete detail plans.

On September 19, 1913, revised detail plans for the proposed water purification plant for Steubenville were received from Messrs. Chester and Fleming of Pittsburg, consulting engineers for the city. The plans were referred to the engineering department and the following report was submitted:

REVISED DETAIL PLANS FOR WATER PURIFICATION PLANT.

The detail plans received September 19, 1913, are in accordance with the general plans received August 5th, and approved by the State Board of Health September 2nd. They provide for the installation of a 6,000,000 gallon water purification plant of the rapid sand type, to be located near the existing high service reservoir so as to intercept and purify the water flowing from the reservoir to the distribution system of the city. With this layout the existing high service reservoir will be utilized as a primary sedimentation basin and will assist in clarifying the river water. The purification plant proper includes a coagulation basin, gravity rapid sand filters, a clear water basin, and the various accessories required in a rapid sand filter plant of modern design.

Primary Sedimentation Basin. The existing high service reservoir, which will be used as a primary sedimentation basin is an open basin, about 270 by 280 feet in plan and 20 feet in depth, giving it a capacity of about 5.5 million gallons. The inlet and outlet ends of the basin will be improved to utilize the capacity of the basin for sedimentation. With proper displacement the basin will furnish a storage period of 22 hours based on the normal capacity of the water purification plant. This will serve to remove a considerable portion of the turbidity of the water. The raw water will be discharged through ten 8-inch riser pipes, connected with a 24-inch manifold extending along the inlet side of the basin and discharging four feet above the overflow line of the basin. The water will fall to a floating splash board at the flow line and aeration will thus be secured, which will assist in the subsequent treatment of the water. The outlet end of the basin is provided with a 24-inch manifold from which ten 8-inch risers extend. The risers are connected with swivel joints, and are provided with floats so that the water may be drawn off just below the flow line. The floating outlets will permit of drawing off 9 feet of the depth of the basin, equivalent to about 4,000,000 gallons.

Coagulation Basin. The settled water from the primary basin will be treated with a coagulant passed through a mixing chamber and allowed to settle in a coagulation basin. The mixing chamber which extends along one end of the coagulation basin is 5 feet by 90 feet in plan and 14 feet in depth. Its capacity, 47,000 gallons, represents a period of eleven minutes, and alternate hanging and submerged baffles, which are adjustable, provide a length of flow of 140 feet or more. The velocity will, therefore, be at least 0.2 foot per second. The baffles should be so arranged to increase the velocity to about 0.4 foot per second.

The coagulation basin is an open reinforced concrete structure, 134 feet 3 inches by 90 feet in plan and 15 feet in average depth. It is separated by a division wall to secure a reversed flow. Hanging and submerged baffles will assist in securing good displacement. Distribution of the flow at the inlet is secured by six, 10-inch riser pipes, placed 6 feet 9 inches on centers across the inlet end and discharging three feet below the flow line. Similar riser pipes are placed at the outlet end of the basin.

The capacity of the basin is 1,359,000 gallons, which represents a period of flow of 5.4 hours, with the plant operating at its nominal capacity. This period should be sufficient to provide proper coagulation of the water.

Filters. The filter tanks are constructed of reinforced concrete and are arranged in two parallel lows of three units each. The area of each unit is 350 square feet and the total area is 0.05 acre. The capacity of the filters at a proper rate of operation is, therefore, 6,000,000 gallons per 24 hours. The filtering material comprises 30 inches of sand, supported upon 10 inches of graded gravel placed around and above the strainer system. One-inch mesh galvanized screen and one-eighth inch mesh brass screen will be placed between the gravel and the sand layers. The strainer system consists of ½-inch brass piping set vertically 6¼ inches on centers both ways, extending through a concrete false bottom 8 inches in thickness, which supports the gravel and sand layers. Each strainer pipe is capped with a special strainer. Below the false bottom is a space 20 inches in depth into which the filtered water will pass and from which it will flow to the effluent piping and clear well.

The wash water troughs are placed with their edges 30 inches above the sand line and it is proposed to utilize a hard wash with a vertical rise of 2.5 feet per minute. A wash water tank 34 feet in diameter and 15 feet in depth, with a capacity of 100,000 gallons, will be placed on a hill near the plant to provide the necessary pressure for washing. Its flow line will be 43.4 feet above the edge of the wash water troughs. Two motor driven, centrifugal wash water pumps are provided.

The pipe gallery between the two rows of filters is generously designed and provides access to the valves and piping. All valves will be hydraulically acuated from operating tables placed in each filter. Rate controllers and loss of head and indicating rate of flow gages will facilitate the proper operation of the filters.

Clear Water Basin. The filtered water is discharged from each unit into a clear water basin placed beneath the filters. This is divided into two portions by the pipe gallery, each 20 feet 10 inches by 61 feet 7 inches in plan and 6 feet in depth. The capacity thus afforded is 56,000 gallons. From this clear water basin the filtered water may be discharged into the distribution system directly or into a second larger clear water basin to be placed immediately east of the filters. The latter method of operation will be normally practiced. The larger clear water basin is 144 feet by 117 feet 8 inches in plan and 16.5 feet in depth. It furnishes a capacity, therefore, of 2,000,000 gallons, equivalent to eight hours storage, based upon the nominal capacity of the plant. It is constructed of reinforced concrete and provided with a concrete roof, supported by columns. Normally the clear water will enter the basin at the northerly end and leave it at the southerly end, and good displacement will occur.

In connection with the storage of filtered water the existing low service reservoirs should be considered. These reservoirs receive water through float valves from a main leading from the high service reservoir and furnish a supply for the main central portion of the city. They are placed side by side and have a total capacity of 2.7 million gallons. One is 110 by 105 feet in plan, 15 feet deep, and is lined with masonry. The other is an unlined excavation 130 by 100 feet in plan and 15 feet deep. Both reservoirs are uncovered. The first mentioned reservoir should be cleaned and covered, and the second reservoir should not be used unless it is properly reconstructed with a lining and cover.

Wash Water Recovery. Owing to the cost of pumping water from the Ohio River to the purification plant, it is deemed advisable by the consulting engineers to install a plant for the clarification and recovery of the wash water from the filters. For this purpose a circular concrete tank 34 feet in diameter and 12 feet deep to the flow line is designed. The capacity is 81,000 gallons, which is sufficient to store the wash water from three filter units, assuming the wash water will be 2.7 per cent of the capacity of the filters. The tank is baffled to assist in sedimentation and the effluent is drawn off from a float pipe taking the settled water just below the surface. The settled water is pumped to the inlet end of the coagulation basin where it again undergoes treatment. Although included in the design the wash water recovery tank will not be installed at this time.

Devices for Chemical Treatment. Provision is made in the design for applying alum as a coagulant when the raw water has satisfactory alkalinity. At times when the alkalinity is deficient, lime will also be added. For the purpose of accomplishing a high bacterial efficiency devices for the application of calcium hypochlorite are to be installed. The chemical solution tanks will be placed on the second floor of the filter building and will discharge through orifice tanks to regulate the treatment. Two alum tanks and two lime tanks constructed of concrete, each 10 feet square in plan and 10 feet in depth, serve to store the solutions. Each tank is provided with a mechanical agitator. The hypochlorite tanks are also of concrete construction, each 4 feet 9 inches by 5 feet in plan and 10 feet in depth. The alum and lime solutions may be applied at the inlet end of the mixing chamber or in the conduit conducting the water to the filters. The hypochlorite solution will be applied to the filtered water.

By-pass Facilities. The piping at the plant will be so arranged that the raw water may be carried around the primary sedimentation basin to the coagulation basin or to the filters direct. This latter practice should never be used. The coagulation basin may also be by-passed and the water from the primary basin conveyed directly to the filters. At such times the coagulant may be applied to the water just before it flows to the filters. It would be desirable to provide for the application of coagulant to the water entering the primary basin to be used when the coagulation basin is bypassed. The coagulation basin may be cleaned in about four hours and it is, therefore probable that the entire plant will be shut down during such cleaning, obviating the necessity of applying the effluent from the primary basin to the filters. No bypass is provided whereby the river water may enter the distribution system without passing through the filters.

Measuring Devices. Venturi meters are to be placed on the main discharge lines from the clear well and booster station, which will take its suction from the filtered water main, and on the wash water line. Records of the water passing these meters will be of value in determining the quantity of water filtered. A master control table in the filter building will contain recording gages connected with the Venturi meters.

Superstructures. The buildings, which will house the filters, pumps, and other accessories, are designed with pleasing architectural effect of Norman style and will add to the general appearance of the surroundings. An office and completely equipped laboratory will be maintained to facilitate the operation of the plant.

SUMMARY.

The revised detail plans for a water purification plant for Steubenville, received from Messrs. Chester and Fleming, consulting engineers, September 19, 1913, are satisfactory and provide for a plant which will purify efficiently the water supply at present obtained from the Ohio

River. The use of the existing high service reservoir as a primary sedimentation basin will assist in the general efficiency and ease of operation of the plant and will also serve as an equalizer in case of varying rates of pumpage at the Ohio River station. The various features of the purification plant proper are well designed and provide for a highly purified effluent. The existing low service reservoirs are, in their present condition, unfit for the storage of filtered water and should be improved.

ACTION OF THE BOARD.

At a meeting held October 15, 1913, the State Board of Health approved these revised detail plans for a proposed water purification plant for Steubenville, received September 19, 1913, from Messrs. Chester and Fleming, consulting engineers, subject to the following conditions:

1st. That samples of filtering material shall be submitted to and receive the approval of the engineer of the State Board of Health before the same is placed;

2nd. That a competent analyst experienced in water purification shall be employed to provide accurate analytical control of the operation of the plant, and that daily records of operation of the plant shall be submitted to the State Board of Health at monthly intervals;

3rd. That the use of coagulants and disinfectants shall at all times be subject to the approval of the State Board of Health; and,

4th. That this approval shall be void unless construction of the water purification plant shall have been commenced prior to July 1, 1914.

The Secretary was instructed to advise the local authorities of the necessity of improving the low service reservoirs to serve as receptacles for filtered water. The reservoir at present lined with masonry should be cleaned and provided with a cover, and the other reservoir, an open excavation, should be reconstructed and provided with a suitable lining and cover.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR SWANTON.

On December 21, 1912, a request for an examination of a proposed additional water supply for Swanton was received from the board of trustees of public affairs. On December 23, 1912, one of the assistant engineers visited Swanton and investigated the proposed additional supply. The following report was submitted:

Swanton, a village with a population of 1,000, is located on Swan Creek in Fulton County about 19 miles west of Toledo. The topography is flat and broken only by the small stream valleys. The glacial drift deposits have a thickness of about 60 feet at Swanton and are underlaid by shale formations. The drift deposits are not waterbearing, except at the point of contact with the shale formations where a limited quantity of water is encountered.

The water supply of the village was installed in 1909, the proposed source having been conditionally approved by the State Board of Health in September, 1908. Prior to the installation of the supply a fairly complete survey of available ground water was made and at only one point, namely, the central portion of the village, was a suitable supply found. At the time of the installation it was estimated that the well would yield approximately 45,000 gallons per day. Since that time, however, the yield has gradually diminished and it has become necessary to reserve the supply for fire protection only. During the past year the village has made an effort to increase the water supply and has considered the development of both surface and ground sources. Several test wells have been installed, but none have produced a satisfactory yield.

Proposed Additional Supply. The village has purchased a small lot 69 by 120 feet facing Mechanic Street immediately north of George Street, and located within the built-up portion of the village. There are a number of houses, barns, and out buildings within 100 feet of the site in all directions, except to the north. A well 6 inches in diameter and 82 feet deep has been drilled at a point 50 feet from a dwelling and 60 feet from a privy. The well penetrates the following formations:

Strata.	*Thickness.*
Top soil	1 foot
Yellow and quicksand	10 feet
Blue clay	38 feet
Sand and gravel	3 feet
Limestone	30 feet

Immediately after the installation of the well the scarcity of water obtained from the existing supply demanded that the new well be utilized, and under date of December 21, 1912, permission to use the well temporarily for fire protection was granted by the Secretary of the State Board of Health. In accordance with this permission the well has been utilized since that time.

Quality of Water. Two samples of water were taken to indicate the quality of the proposed additional supply on December 23, 1912. The results of the analyses indicate that at the present time the supply is satisfactory from a sanitary standpoint but its mineral characteristics are objectionable. The present satisfactory hygienic quality of the water is, however, not to be taken as an indication that it will remain so, as the supply is subject to the danger of deterioration, owing to the very unsatisfactory location of the well. Heavy pumping may induce the flow of polluted subsoil water to the well in which case the contamination of the supply will result.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held January 22, 1913, the proposed additional water supply for Swanton, to be obtained from a well 82 feet deep, located on Mechanic Street, immediately north of George Street, was disapproved as an additional water supply.

The Board advised the authorities to secure a supply from wells at a more satisfactory location as regards the proximity of sources of pollution.

On May 5, 1913, plans for a proposed additional water supply for Swanton were received from Mr. George Champe, of Toledo, consulting engineer for the village. The plans were referred to the engineering department and based upon knowledge of local conditions, and examination of the plans, the following report was submitted:

During the past year various efforts have been made to install an additional or new water supply. Surface sources, as well as wells, have been considered, but owing to the scarcity of surface water the choice has been narrowed to well development. In July, 1912, the State Board of Health approved of extensions of the water works system to provide additional storage of the supply. In January, 1913, the Board disapproved of a proposed additional supply to be obtained from wells in the central portion of the village.

At the present time the entire supply, which does not exceed 12,000 gallons per day, is obtained from the wells originally installed in the central portion of the village.

PROPOSED ADDITIONAL SUPPLY.

It is now proposed by the village to install an additional water supply to be obtained from a well located about one-half mile west of the westerly corporation line. The village has secured and obtained an option on a one acre tract of ground at this location and has drilled a test well to determine the available quantity and quality of the supply. The site is satisfactorily located with respect to the village, there being no houses within 500 feet of the site. Upon the property under option, however, are located a house, barn, and out buildings, which would be entirely too close to water supply wells. It is desired to maintain the dwelling for occupancy by the pumping station operator, but it will be necessary to remove the out buildings and barn and to provide a suitable method of disposal of the wastes.

The test well which has been drilled extends to a depth of 88 feet and is cased with 6-inch casing. The well penetrates the following formations which are typical of the geological section of the vicinity:

Soil	2 feet
Quicksand	8 feet
Clay	15 feet
Sand	2 feet
Slate	31 feet

The water is derived from the slate formation from which it rises under artesian pressure to a point 22 feet below the surface of the ground. The well was tested by pumping continuously for 48 hours, and is estimated to yield 24,000 gallons per day. It is proposed to place a deep well pump on the well and install a discharge line connecting with the distribution system in the westerly portion of the village.

The quality of the water derived from the well is shown by analyses of samples collected April 10, 1913, after the forty-eight hour pumping test referred to. The results of the examination indicate that the water is satisfactory in its physical characteristics except for moderate turbidity caused by the iron content. The water is high in chlorine, though not sufficient to cause a briny taste. The hardness of the water is high, but it contains no incrusting constituents. The sanitary quality of the water appears to be good, although the presence of gas forming organisms is suspicious. Continued pumping of the well will probably improve the bacterial content.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held May 22, 1913, the proposed additional water supply for Swanton, to be obtained from a drilled well at a point about one-half mile west of the village, as shown on plans received from Mr. George Champe of Toledo, consulting engineer, on May 5, 1913, was approved subject to the following conditions:

1st. That all barns, barnyards, cesspools, privies and other possible sources of pollution within 500 feet of the site of the wells be removed, and that privies within that distance be reconstructed and maintained in accordance with rules and regulations included in the Board's approval of the present water supply granted September 23, 1908.

2nd. That detailed plans of the development of the proposed additional supply be submitted to the State Board of Health.

3rd. That this approval shall be void unless the proposed additional supply shall have been installed prior to January 1, 1914.

The village authorities were advised to conduct thorough pumping tests to determine the availability of a sufficient supply before any considerable investment was made for equipment to develop the supply.

On November 1, 1913, a cummunication was received from Dr. Lewis Cosgrove, mayor of Swanton, requesting approval of a proposed additional water supply for the village to be used for fire protection purposes. This request was referred to the engineering department and, based upon knowledge of the local conditions, the following report was submitted:

INSTALLATION OF SUPPLY AND ACTIONS OF THE STATE BOARD OF HEALTH.

The public water supply of the village was installed in 1909, being obtained from a drilled well located within the built-up portion of the village. Although the location of this well was not satisfactory the Board approved the supply for the reason that a previous survey had indicated the scarcity of ground water and at only one point near the central portion of the village, was a satisfactory quantity of water found. This supply, however, failed to furnish sufficient water and in April, 1912, it was proposed to install a new water supply of surface origin. The Board did not approve this supply on account of the uncertainty of its yield. In July, 1912, plans for improvement of the existing supply, including new pumping machinery and a storage reservoir, were approved by the State Board of Health with a condition that the village make a complete survey of all available sources of supply. The new pumping machinery has been installed, but the storage reservoir has not been constructed.

In January, 1913, the State Board of Health considered a proposed additional water supply to be obtained from a drilled well within the built-up portion of the village. On account of its location this proposed supply was disapproved. The village next attempted to secure a water supply from wells on property located about one-half mile west of the corporation. A test well was installed at this point and in May, 1913, the proposed new supply was conditionally approved. On account of the estimated cost of development, however, the village has taken no steps to install this supply.

At the present time the entire supply is derived from the well originally installed in 1909. This well yields a limited quantity of water, not exceeding 12,000 gallons per day, which is not sufficient for the needs of the village. The supply is retained principally for fire protection and is not used generally for domestic purposes. Various analyses of the existing supply made by the State Board of Health have indicated that the quality is satisfactory from a sanitary standpoint.

PROPOSED ADDITIONAL WATER SUPPLY.

Due to the shortage of the existing water supply it is necessary for the village to secure an additional supply to furnish fire protection. The attempts to locate a satisfactory ground water supply of sufficient quantity for all the needs of the village have led the authorities to abandon the hope of securing an adequate water supply and it has been decided to install a supply for fire protection only and to restrict its use for other purposes. In a communication received November 1, 1913, it is proposed to utilize a well installed during 1912 on a small lot 69 by 120 feet facing Mechanic Street and immediately north of George Street. This lot is located within the built-up portion of the village. The proposed additional supply is the same one which was disapproved by the State Board of Health in January, 1913. At this time, however, it was proposed to use the supply for domestic, as well as fire protection purposes.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved this proposed additional water supply for Swanton to be obtained from a well 82 feet deep, located on Mechanic Street immediately north of George Street, as described in a communication received from Dr. Lewis C. Cosgrove, mayor, November 1, 1913, subject to the following conditions:

1st. That the existing and proposed additional water supply shall be utilized for fire protection purposes only and that no connections to the mains shall be made for any other purposes;

2nd. That the village council shall pass and file with the State Board of Health an ordinance providing for the removal of all existing domestic connections, and prohibiting future domestic connections to the distributing system, and that the mayor shall file with the Secretary of the State Board of Health an affidavit that all such existing connections have been removed.

3rd. That the village shall have a complete survey made of available sources of water supply of surface origin with the intention of ultimately installing a supply of satisfactory quality and quantity; and,

4th. That this approval shall become void January 1, 1916, before which time a permanent water supply shall have been provided.

EXAMINATION OF WATER FROM SWANTON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
12014	1912 Dec. 23	5.	16.	distinct	none	1.2	.030	.654	0	.4
12015	Dec. 23	3.	14.	distinct	none	.82	.028	.942	0	.4

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
12014	315.	412.	none	986.	54.	1.2	290	Neg. 10 cc.
12015	315.	412.	none	978.	62.	1.3	380	Neg. 10 cc.

Source of Samples.

12014 — Drilled well, 52 feet deep. } Duplicates.
12015 — Drilled well, 52 feet deep. }
The above samples were collected by Mr. L. H. Van Buskirk.

EXAMINATION OF WATER FROM SWANTON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
	1913									
12268	April 10	0	16.	slight	none	.62	.040	.364	0	0
12269	April 10	0	16.	slight	none	.65	.026	.358	0	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
12268	126.	290.	0.0	542.	30.	1.1	120	Gas. 1 and 10 cc.
12269	128.	288.8	0.0	540.	36.	1.3	......	Acid Col. 1 and 10 cc. Bacterial broken.

Source of Samples.

12268 — Village drilled well.
12269 — Duplicate

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR WESTERVILLE.

At the request of Mr. F. F. Kidwell, superintendent of water works, one of the assistant engineers visited Westerville on March 10, 1913, to investigate a proposed additional supply for the village. The following report was submitted:

Westerville, a village with a population of 1,900, is located in Franklin County on Alum Creek about twelve miles north of Columbus. The public water supply of the village was installed in 1903, being obtained from four 8-inch drilled wells 175 feet deep. Recently, the wells have failed to supply an adequate quantity of water and it has become necessary to increase the available supply.

The present wells are located in the northeastern portion of the village near the Cleveland, Akron and Columbus Railroad on a tract of ground two acres in area. The site is surrounded on three sides by the built-up portion of the village, and there are a number of dwellings with privy vaults within 500 feet of the wells. The location of the wells is, therefore, unfavorable and although past analyses have shown the water to be of satisfactory sanitary quality, the danger of pollution of the supply exists. The territory near the wells is developing somewhat rapidly, there being at the present time some five or six houses in the course of construction within 1,000 feet of the wells. It is obvious that with the continued growth of the village, the present site will become entirely unsatisfactory and a new location for the supply wells will be required. In a letter dated August 2, 1912, the authorities were advised of the unsanitary condition in the vicinity of the wells, but no steps have been taken to improve them.

PROPOSED ADDITIONAL SUPPLY.

The proposed additional water supply for the village is to be obtained from a well 440 feet deep, located in the southwesterly corner of the water works property. This well is somewhat closer to the surrounding sources of pollution than the existing wells. Water is obtained from the limestone encountered from depths of 260 feet to 440 feet and rises to a point 92 feet from the surface of the ground. At present a 10-inch casing extends to a depth of 63 feet, where it is reduced to an 8-inch casing extending to a depth of 290 feet below the surface. By pulling the casing of the well it is proposed to draw water from a horizon 175 to 200 feet below the surface. The yield of the well, as demonstrated by a pumping test of 52 hours duration, is approximately 50,000 gallons per day. The well was pumped by air lift under satisfactory conditions.

The quality of the proposed additional water supply is demonstrated by analysis of a sample collected March 10, 1913. The physical characteristics are unsatisfactory owing to the presence of turbidity caused, no doubt, by the precipitation of the excessive iron content. Aside from the iron the water is objectionable in its mineral characteristics and has a much greater mineral content than the existing supply. From a sanitary standpoint the water may be considered satisfactory. The quality of the proposed additional supply is very similar to the existing supply, except for its increased mineral content. As is the case with the existing supply, the additional supply will be entirely unsatisfactory for commercial use and will cause objection in domestic use.

SUMMARY.

In the foregoing report it will be noted that the present water supply of Westerville is obtained from wells located dangerously near possible sources of pollution. The growth of the village, therefore, is constantly encroaching upon the wells. The quality of the present supply is objectionable from its mineral characteristics. The proposed additional supply is to be obtained from a somewhat deeper well on the same property with the existing wells. The water is of more objectionable mineral characteristics than the existing supply, although satisfactory at the present time from a sanitary standpoint. The shortage of water available requires that an additional supply be placed in service immediately, and it would, therefore, seem reasonable to permit the village to utilize the supply from the new well to meet the existing necessity.

ACTION OF THE BOARD.

At a meeting held March 20, 1913, the State Board of Health approved for temporary use, the proposed additional water supply for Westerville, to be obtained from one or more drilled wells 440 feet deep (approximately) located at the site of the existing public supply wells, subject to the conditions that the approval become void January 1, 1915.

The mayor and council were informed that the location of the existing and proposed additional public water supply wells is unsatisfactory, due to the proximity of sources of pollution, and that the encroachment of habitations near the wells, resulting from the development of the village is rapidly increasing the danger of pollution of the supply; also that the quality of the proposed additional supply is very objectionable due to its mineral constituents.

They were also advised that immediate steps should be taken to locate a source of ground water supply of satisfactory quality and adequate quantity at a point removed from the built up portion of the village and a new supply should be installed and ready for use prior to January 1, 1915, the date at which the temporary approval of the proposed additional supply shall expire.

EXAMINATION OF WATER FROM WESTERVILLE.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
	1913									
12135	March 10	1.	21.	vy. dist.	sl. musty	1.4	.036	.854	.0004	0
12136	March 10	2.	20.	vy. dist.	sl. musty	.55	.036	.268	.001	0

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
12135	137.	527.	82.5	1186.	96.	4.4	100	Neg. 10 cc.
12136	26.5	405.	153.5	727.	110.	3.8	70	Neg. 10 cc.

Source of Samples.

12135 — Discharge from air lift.
12136 — Tap in pump station.
The above samples were collected by L. H. Van Buskirk.

REPORT ON PROPOSED EXTENSION OF WATER SUPPLY OF YOUNGSTOWN.

On April 22, 1913, plans and specifications for a proposed extension of the water supply of Youngstown were submitted by Mr. F. M. Lillie, city engineer. Application for approval of these plans was received from Mr. Veeder Heasley, director of public service, April 29, 1913. The plans were referred to the engineering department for investigation and report. In anticipation of the submission of the plans, and in connection with an investigation of a proposed enlargement of the water purification plant, the chief engineer visited Youngstown on July 11, 1912, and made a thorough examination of the contemplated extension of the water supply. The following report was submitted:

Youngstown, a city with a population of approximately 90,000, is located in Mahoning County on the Mahoning River about 20 miles above its confluence with the Beaver River. The city is largely devoted to manufacturing interests of which the steel industry is the most important. The growth of the city since 1870, when its population was 8,000, has been greater than that of any other Ohio city, the average increase during each decade being 79.4 per cent. It is reasonable to suppose that the growth of the city will continue at a rapid rate. In the way of municipal improvements Youngstown is provided with a public water supply obtained from the Mahoning River treated by a rapid sand filter plant, a fairly complete system of sewers and a number of miles of paved streets.

PRESENT WATER SUPPLY.

The first water supply of the city was installed in 1872, and until 1904 the supply was drawn from the Mahoning River without purification. At various times from 1899 to 1903 studies were made by engineers employed by the city looking to an improvement in the quality of the supply. The very unsatisfactory quality of the Mahoning River water brought about recommendations that it be abandoned and that a source of supply be obtained from another tributary stream. Mill Creek, Meander Creek, and Mosquito Creek were each considered, and reports indicated that any of the above mentioned creeks afforded opportunity as an ultimate source of water supply for the city.

Finally in 1903 it was recommended by Mr. George W. Fuller that the Mahoning River be retained temporarily as a source of water supply and that a water purification plant of ten million gallons capacity be installed near the existing pumping station. This point was selected as it offered the possibility of conveying by gravity water from any of the surface sources considered. It was pointed out at that time that the Mahoning River could not be considered as a permanent source of water supply without storage and that without such development it would serve the city only until 1914.

The water supply of Youngstown and the purification plant has been described in previous report of the Ohio State Board of Health. Water is taken from the Mahoning River near the central portion of the city, passed through a rapid sand filter plant and pumped into the distribution system. Above the intake the stream has a watershed area of 960 square miles which contains a population of 94,000, equivalent to 98 per square mile. Of this population 48,000 are included in communities of 2,500 population or more. The most thickly settled portion of the watershed lies immediately above Youngstown. Within a distance of 16.5 miles are located the following communities:

Community.	*Miles Above Intake.*	*Population.*
Girard	5	4,000
Niles	9	8,500
Warren	16.5	12,000

The sewage from all of these communities is discharged without treatment into the Mahoning River and seriously contaminates the water supply of the city. Within the city of Youngstown above the water supply intake the Briar Hill district, so-called, is tributary to the river. Although no complete system of sewers has been installed in this district, an appreciable amount of pollution is discharged into the river. The stream receives from this district, moreover, large volumes of manufacturing wastes consisting principally of spent pickling liquor and sewage.

As a result of the excessive pollution of the Mahoning River the water at the intake is difficult to treat efficiently and the water purification plant has failed to produce continuously a satisfactory effluent.

The capacity of the water purification plant has during the past few years been severely taxed to purify sufficient water for the city, and at times the acknowledged safe rate of filtration has been greatly exceeded. In August, 1912, the State Board of Health approved plans for an enlargement of the water purification plant designed to provide more efficient means of treatment as well as increased capacity. The installation of the improvement is now in progress.

PROPOSED EXTENSION OF WATER SUPPLY.

The Mahoning River at Youngstown is extensively used as a source of water supply for industrial purposes. It has been roughly estimated that at the present time a total of 300,000,000 gallons per 24 hours is pumped from the river for cooling and condensing purposes at the various steel mills. As a result of the excessive use of water the temperature of the river water during low flows is increased to such an extent that it becomes worthless for cooling purposes.

The minimum dry weather flow of the Mahoning River at Youngstown is roughly estimated at 15,000,000 gallons per day. There are no doubt periods when the flow of the river is insufficient to supply the water required for the city. It is of course insufficient to provide a satisfactory supply for the industries.

For the purpose of equalizing the flow of the Mahoning River to provide a sufficient water supply for the city and for industrial use it is proposed to construct a storage reservoir upon the stream about 40 miles above the city. Steps have already been taken by the council to install the improvement and at the present time almost all of the land to be secured has been purchased. Plans have also been made for the construction of a dam to impound the flow of the stream. The estimated total cost of the improvement is $1,000,000.

Briefly, the plans submitted by the city engineer provide for the construction of a dam in the Mahoning River which will impound a reservoir sufficient to supply a greatly increased flow in the stream during dry weather. As affecting the water supply the increased flow will provide sufficient water at the intake at all times. The plans do not include the extension of the water supply intake to the reservoir or to any point up-stream from its present location.

The site selected for the proposed reservoir lies entirely within Milton Township from which it derives its name, The Milton Reservoir. The dam will be located 16 miles in an air line west of Youngstown, the increased distance by water being due to a wide curve in the course of the Mahoning River between the dam and the city.

The plans for the proposed dam provide for an earthen dam with a concrete spillway. The dam has a total length of 2,850 feet, of which the spillway length is 650 feet. The elevation of the spillway will be 45 feet above the low water level of the Mahoning River, and the top of the dam will be placed 10 feet above the spillway, thus providing for a maximum discharge depth of 10 feet without overflow of the dam. Four 60-inch blow-off valves are placed at the west end of the spillway at such elevation that the entire content of the reservoir may be drawn off.

The watershed area above the proposed dam is 302 square miles. It consists largely of farming country and is not extensively wooded. The population upon the watershed is approximately 30,000, representing 100 per square mile. The only two communities of importance are Alliance, with a population of 17,000, and Sebring, with a population of 2,500, located 23 and 29 miles, respectively, by water above the proposed dam. The sewage from both of these communities is treated before being discharged into the Mahoning River.

The reservoir formed by the construction of the dam, will at the level of the spillway cover an area of 1,742 acres, and at that elevation will contain 9,970,000,000 gallons. The capacity of the reservoir at various other depths is given in the accompanying table.

Elevations.	*Area of Water Surface. Acres.*	*Contents of Reservoir. Million Gallons.*
955	1,908	12,940
950	1,742	9,970
945	1,598	6,800
940	1,251	4,930
935	1,008	3,062
930	634	1,700
925	314	780
920	146	260

Elevation of spillway, 950.
Elevation of bottom of stream at dam, 905.

The average depth of the reservoir when full is 17.5 feet and its maximum depth 45 feet. The area with a depth of 5 feet or less when the reservoir is full is 144 acres, representing 8.2 percent of the total area. No specifications have been prepared for the stripping and clearing of the reservoir site to insure against deterioration of the quality of the water stored.

The flow of the Mahoning River at the site of the reservoir has not been gaged. Gagings have been made, however, at various points along the Mahoning River which indicate that the minimum flow is from 0.01 to 0.02 second foot per square mile to watershed area. It is probable that the minimum flow of the river at the site of the dam does not exceed six cubic feet per second. The maximum discharge of the river is estimated by the city engineer at 18,000,000,000 gallons, or 29,300 cubic feet per second. On the basis of a maximum discharge of 200 second feet per square mile, the maximum flow of the stream is 60,000 cubic feet per second, which will produce a head on the spillway of 9.2 feet. It is proposed to maintain the flow of the Mahoning River below the dam at a minimum of 90,000,000 gallons per 24 hours. With the reservoir full, therefore, about 100 days' supply at this rate is provided without additional inflow to the reservoir or stream below the dam.

EFFECT UPON QUALITY OF WATER SUPPLY.

The storage of the Mahoning River in the proposed reservoir will accomplish an improvement in the quality of the water by sedimentation. In its passage down the channel of the Mahoning River below the dam, however, the flow will receive the sewage from the various cities and villages located above the water supply intake. As it reaches the intake it will, therefore, have become deteriorated and will require efficient purification. It is known that the operation of the Youngstown water purification plant is not simplified by moderately high flows in the stream. It would, therefore, appear that although the proposed improvement will solve the question of available quantity, it will not assist to an appreciable extent in the improvement of the quality of the raw water. The water supply intake should be extended in an upstream direction to a point above the influence of pollution from the center of population near Youngstown. In other words the water should be obtained above Warren, if not from the reservoir itself.

SUMMARY.

From the foregoing report it will be noted that the city of Youngstown proposes to extend its water supply by the installation of a large reservoir in the Mahoning River, 40 miles above the city. The reservoir will serve to equalize the flow of the stream and provide a minimum of 90,000,000 gallons per day during dry weather. The development of the reservoir should include a careful preparation of the sides and bottom to prevent deterioration of the water. The quality of the raw water obtained from the Mahoning River will not be satisfactorily improved until the intake has been extended to a point above nearby sources of pollution. If the Mahoning River is kept as a permanent source of water supply, this improvement will be necessary.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held May 22, 1913, the proposed extension to the water supply of Youngstown, as shown on plans for the development of the Milton Reservoir, so-called, submitted by Mr. F. M. Lillie, city engineer, April 22, 1913, was approved subject to the following conditions:

1st. That specifications satisfactory to the engineer of the State Board of Health for clearing and stripping the reservoir site be submitted to the State Board of Health prior to the award of a contract for any portion of the reservoir construction.

2nd. That plans and estimates of cost for the extension of the water supply intake (a) to the proposed Milton Reservoir, (b) to the Mahoning River above Warren, and (c) to a source of water supply other than the Mahoning River be prepared and submitted to the State Board of Health, together with a definite statement from the city council adopting one of the plans and requesting its approval by the State Board of Health; and,

3rd. That this approval shall be void unless the foregoing second condition shall have been complied with prior to January 1, 1914, and an extension of the water supply intake in accordance with one of the aforesaid plans shall have been made prior to January 1, 1915.

The attention of the authorities was called to the second and third conditions of approval requiring the extension of the water works intake, and they were informed that no approval of the Milton Reservoir as an extension of the water supply of Youngstown had been granted until these conditions had been complied with.

SEWERAGE AND SEWAGE PURIFICATION

REPORT ON PROPOSED SEWAGE TREATMENT PLANT FOR AKRON.

On June 18, 1913, general plans for a proposed sewage treatment plant for Akron were received from Mr. R. Winthrop Pratt, consulting engineer for the city. The plans were referred to the engineering department and the following report was submitted:

Akron, a city with a population of 80,000, is located in Summit County on the Little Cuyahoga River, just above its confluence with the Cuyahoga River. The city is at present provided with a water supply obtained from Summit Lake and furnished to the consumers without purification other than that obtained by treatment with calcium hypochlorite. A new water supply to be obtained from the Cuyahoga River and purified by a rapid sand filter plant is now in process of construction. The city is provided with a fairly complete system of sewers constructed partly on the combined plan and partly on the separate plan. The first sewers in the central portion of the city, installed about 1880, are built on the combined plan, but all extensions to the original sewers have been constructed on the separate plan. The dry weather sewage flow is discharged into the Little Cuyahoga River at a point within the city, and storm water overflows are located along the river and canal.

PREVIOUS ACTIONS OF THE STATE BOARD OF HEALTH.

In 1907 the State Board of Health considered a plan for extending the outlet sewer of the city to a point near the confluence of the Little Cuyahoga River and the Cuyahoga River. At this time it was intended to construct a large combined sewer and the Board advised the installation of an intercepting sewer to separate the storm and dry weather flow. In June, 1910, the Board considered a plan for an intercepting sewer with an outlet into the Little Cuyahoga River a short distance above the mouth of the river. This plan was approved and the city was granted six months' time in which to submit to the State Board of Health a definite plan for disposing of the sewage of the city. Owing to the desirability of carrying on experiments to learn the best method of treatment of the sewage of the city the Board at a meeting held in January 1911, voted to grant a reasonable extension of time for carrying out the experiments necessary. At this time it was stated that the city had purchased a site for sewage treatment works and had appropriated $10,000 for experimental work. The experiments referred to were carried on from January 1, 1912, until September 13, 1912. Under date of October 10, 1912, a report upon the experimental studies was submitted to Mr. R. M. Pillmore, director of public service, by Mr. H. B. Hommon, chemist.

Prior to the completion of these experimental studies the Board was asked to approve of plans for the disposal of the sewage and garbage of the city, the proposed installation to have been made by a private corporation without expense to the city. Owing to the fact that these plans did not provide for efficient treatment of the sewage the Board disapproved of them in July 1912.

EXISTING SEWERAGE.

The sewerage system of the city has a total length of approximately 100 miles and the principal portion of this is constructed on the separate plan. In this connection it should be stated, however, that the sanitary sewers are for the most part poorly constructed with leaky joints which during wet weather admit large quantities of ground water. The sewage from the entire city is collected in an intercepting sewer which discharges near the northerly edge of the thickly built up portion of the city. The city is now constructing an extension sewer 60 inches in diameter which will convey the dry weather flow to a point near the mouth of the Little Cuyahoga River. At this point a site has been purchased for sewage treatment works.

The present population tributary to the sewers is estimated at from 65,000 to 75,000. No accurate measurements have been made to determine the volume of the sewage flow but it has been estimated that the average flow is 11,000,000 gallons per day. The sewage flow is subject to wide fluctuations due to the condition of the sewers and also to the fact that an appreciable quality of the sewage is from manufacturing plants. In view of the water consumption which is approximately 7.5 million gallons per day the sewage flow is excessive. More accurate information relative to the sewage flow is necessary.

RESULTS OF EXPERIMENTAL STUDIES.

The experimental studies carried on at the sewage testing station had for their object the following purposes:

"1. To determine whether trade wastes can be best handled with the sewage or independently.

"2. To select the most efficient and economical processes of preliminary and final treatment with the optimum routine and rates of operation of the same.

"3. To study the sludge problem and devise the best means for its solution.

"4. To investigate the diluting capacity of the river with reference to sewage in various stages of purification.

"5. To determine the suitability of local material as filtering media.

"6. To discover, if possible, a means of prevention of aerial nuisance arising from the using of sprinkling filters."

The station was equipped to furnish adequate means of studying the various phases of the sewage problem and for extensive analytical work. The following recommendations were made by the chemist in charge:

> "The tests have clearly shown that the sewage of the City of Akron can successfully be purified at a plant which would comprise:
>
> "1. A small grit chamber for the removal of sand.
>
> "2. Imhoff Tanks of a capacity equivalent to a period of flow of about 2.5 hours, and sludge beds corresponding to an average net accumulation of about 1.4 tons of dry solids per million gallons.
>
> "3. Sprinkling filters operated at the rate of 2,000,000 gallons per acre in 24 hours, and small settling basins of about 2 hours' flow, with ample means for the withdrawal of sludge.
>
> "4. Adequate means for the disposal of an accumulation in the settling basins of about 0.5 ton of dry solid matter per million gallons."

The evidence is conclusive that such a plant would purify the sewage of Akron in a most thorough manner, and under continued proper operation and efficient supervision, would prevent all visible contamination of the Cuyahoga River below the outlet of the Akron sewers.

PROPOSED SEWAGE TREATMENT PLANT.

The 60-inch intercepting sewer will normally deliver the dry weather flow to the sewage treatment plant. The capacity of the sewer flowing full is 82 million gallons per 24 hours, which flow may be reached during excessive rainfall. General plans for a proposed sewage treatment plant for Akron have been prepared by the consulting engineer for the city. It is desired to obtain approval from the State Board of Health as to the general type of plant provided and its location, and detailed plans of the various devices will be submitted at a later date. In general the plans provide for the installation of a plant comprising a screen chamber, grit chambers, sedimentation tanks, sludge filters, sprinkling filters, secondary sedimentation tanks, and secondary sludge filters. The plant as a whole is designed for a population of 150,000 and an assumed sewage flow of 15,000 gallons per day upon the basis of 100 gallons per capita tributary. Inasmuch as the population of the city will not reach 150,000 prior to 1930, the life of the plant without enlargement is practically fifteen years. The assumption of the sewage flow, 100 gallons per capita, is not founded upon extensive measurements of the present flow and may vary widely from the actual figures.

Site. The location of the proposed sewage treatment plant is a tract of 65 acres, situated in the valley of the Little Cuyahoga River about one mile north of the northerly corporation line of the city and immediately south of the confluence of the Cuyahoga and Little Cuyahoga Rivers. There are two dwellings within 1,000 feet of the site both of which are owned by the city and will be used in connection with the maintenance of the plant. Fifteen hundred feet east of the proposed plant is an area used for the disposal of the garbage from the city, the process employed being burial and feeding to the swine. A short distance south of the proposed plant is a fertilizer works which has been maintained for a number of years. It will be seen that the vicinity is devoted to offensive trades and the addition of sewage treatment works will probably not be objectionable. The city also contemplates the construction of a municipal garbage reduction plant at the site of the proposed sewage treatment works.

The topography of the site is favorable for the location of the plant. The total head available on the site is 20 feet which is sufficient to provide a gravity flow for the type of plant selected. To protect the plant against floods a levee will be constructed to a uniform elevation 2 feet above the highest water level.

Screen Chamber. The screen chamber is an open concrete structure divided longitudinally into two compartments, each 5 by 16 feet in plan. Two bar screens with openings of 1¾ inch are placed in each compartment. Stop planks are provided by means of which either or both compartments may be utilized. Screenings will be disposed of by burial or incineration at the proposed municipal garbage plant.

Grit Chamber. The grit chamber will be placed adjacent to the screen chamber. It is an open rectangular concrete structure divided into three compartments, each 15 by 56 feet in plan. Each compartment is provided with two longitudinal baffles so that the length of flow is three times the length of the compartment. The capacity of each compartment may be adjusted by varying the depth of flow. It is aimed to provide a retention period of three minutes with a velocity of flow of 60 feet per minute. Within the limits of the capacity of the works this may be accomplished.

Sedimentation Tanks. The general plans provide for four sedimentation tanks of the two-story type with separate settling and sludge compartments. Each tank is 212.7 feet in length, 26 feet wide and 24 feet in depth from the flow line to the sludge well. Each unit is provided with two parallel sedimentation compartments 10 feet wide extending the full length of the unit. Below the sedimentation compartments in each unit are eight sludge wells. The total sedimentation capacity is 1.2 million gallons which provides 1.92 hours storage with a sewage flow of 15,000,000 gallons per day. With this flow the velocity will be 2.2 feet per minute. The sludge capacity is 110,000 cubic feet which provides a period of sludge retention for 150,000 persons of 70 and 140 days for combined and separate sewers respectively. Sludge piping is provided for the withdrawal of the sludge by gravity. The design provides for the operation of the tanks in parallel or in series.

Sludge Filters. For the drainage and drying of the sludge, an area of 59,600 square feet divided into 11 units each 20 by 298 feet, is provided. This area provides for 400 square feet per 1,000 population. The filtering material will be of sand 18 inches in thickness and will be suitably underdrained. Industrial tracks for sludge cars will facilitate the cleaning of the beds.

Dosing Chamber. The effluent from the sedimentation tanks enters a dosing chamber extending along the ends of the tanks provided for the proper application of the sewage to the sprinkling filters. The dosing chamber is 107 feet in length, 10 feet in width and 6 feet in depth. Its capacity, 48,000 gallons, represents a retention period of 5½ minutes which will insure practically continuous operation of the filters. It discharges through two 36 inch pipe lines upon which will be placed butterfly valves controlled by cams actuated by electrical motors.

Sprinkling Filters. For the oxidation of the tank effluent an area of eight acres of sprinkling filters is provided. This area is subdivided into eight units which permits flexibility of operation. The filters will be constructed with filtering material of slag or broken stone 6 feet in depth. With a sewage flow of 15,000,000 gallons the rate of operation of the filters will be 1.87 million gallons per acre per day, 0.31 million gallons per acre foot per day, and 193 gallons per cubic yard per day. The general plans for the installation of the filters provide for a distribution system, discharging through nozzles, and an underdrainage system of vitrified half tile. Galleries will be provided along the upper end of the underdrains to facilitate ventilation and cleaning of the drains.

Secondary Settling Basin. Two plain secondary settling basins each 172 feet in length, 50 feet in width, and 24 feet maximum depth, are provided for the clarification of the filter effluent. The effective capacity of these settling basins is 2 million gallons, which provides a retention period of 3.2 hours. The bottoms of the basins are separated into inverted pyramidal wells, with a total capacity of 38,000 cubic feet, from which the sludge may be drawn by gravity through a system of piping to a sludge well. From this well it will be raised by a 6-inch motor driven centrifugal pump to a secondary sludge filter.

Secondary Sludge Filter. This filter is 208 feet in length, 98 feet in depth and has an area of 20,000 square feet which is sufficient for the drying of the sludge from the secondary basins. It should be noted, however, that the sludge from such basins is finely divided and difficult to drain and dry, and it would be desirable to omit the construction of secondary sludge filters and to provide for the pumping of the sludge to the outlet end of the primary sedimentation tanks.

Laboratory and Office. The building containing the butterfly control valves is a brick structure 32 by 22 feet in plan, which will also be utilized as a laboratory and office for the chemist in charge of the plant. This feature will be of assistance in securing proper operation of the plant.

Disposal of Effluent. The effluent from the proposed sewage treatment plant will be discharged into the Little Cuyahoga River, about 400 feet above its confluence with the main stream. A backwater check valve will be provided to prevent the inflow of flood water. The watershed area of the river above the point of outlet is roughly 70 square miles, and the minimum dry weather flow does not exceed five second feet. It will, therefore, be necessary to secure a practically non-putrescible effluent at times of low flow to prevent a nuisance. It may be found advisable to extend the outlet to the Cuyahoga River where a more suitable dilution will be obtained.

SUMMARY.

From the foregoing report it will be noted that the city of Akron has had prepared general plans for a proposed sewage treatment plant, the design of which is in accordance with recommendations resulting from extensive studies of methods of sewage treatment for Akron. The general plans provide for a plant incorporating as its principal features sedimentation tanks and sprinkling filters. With proper operation such a plant will prevent the production of a nuisance in the Little Cuyahoga River during ordinary stages of the stream.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the general plans for a proposed sewage treatment plant for Akron, received June 18, 1913, from Mr. R. Winthrop Pratt, consulting engineer, were approved subject to the following conditions:

1st. That complete detailed plans for the proposed sewage treatment plant shall be submitted to and receive the approval of the State Board of Health;

2nd. That in connection with such plans data on the volume of sewage flow, as obtained from extensive measurements, shall be submitted to the State Board of Health; and,

3rd. That this approval shall be void unless the aforesaid detailed plans shall have been submitted prior to December 1, 1913.

The mayor and council were informed that in granting an approval of the general plans, the Board sanctioned the installation of a plant comprising as its essential features sedimentation tanks and sprinkling filters at the site shown on the plans, but will hold in abeyance approval of details of the proposed plant pending the submission of complete detailed plans.

REPORT ON REQUEST FOR EXTENSION OF APPROVAL OF SANITARY SEWERS FOR ARLINGTON HEIGHTS.

On January 15, 1913, a communication was received from Mr. A. J. Orth, clerk of the village of Arlington Heights, requesting an extension of approval of sanitary sewers proposed for Arlington Heights. The communication was referred to the engineering department and the following report submitted:

In April 1912, plans and specifications for a proposed system of sanitary sewers for Arlington Heights, submitted by Mr. H. C. Innes, consulting engineer for the village, were conditionally approved by the State Board of Health. One of the conditions provided that the approval should become void unless contracts for the installation of the proposed sewers should have been made prior to September 1, 1912.

In July 1912, the State Board of Health considered the request made by the consulting engineer for an extension of the time of approval and extension of time limit until January 1, 1913.

Owing to the delay in legal proceedings the local officials have found it impossible to enter into a contract for the construction of the sewers prior to March 1, 1913. There appears to be no reason why the Board should not extend the time limit to permit of proper preliminary procedure in accordance with the approval of the Board.

ACTION OF THE BOARD.

At a meeting held January 22, 1913, the State Board of Health considered the request of the mayor and council, transmitted by Mr. A. J. Orth, village clerk, January 7, 1913, for an extension of the time limit of the Board's approval of a proposed system of sanitary sewers for Arlington Heights, given April 11, 1912, and revised July 18, 1912, and they were notified that the third condition of the said approval was revised to read:

That this approval shall be void unless contracts for the construction of the proposed sewers shall have been made prior to July 1. 1913.

REPORT ON SEWERAGE AND SEWAGE TREATMENT FOR BEDFORD.

On January 20, 1913, plans for a proposed system of combined sewers for Bedford, prepared by Messrs. W. J. Watson and C. W. Courtney, engineers for the village, were received from Mr. L. R. Landfear, village solicitor. Based upon an examination of the plans by the engineering department and information gained by a previous visit of one of the assistant engineers on April 19, 1912, the following report was submitted:

Bedford, a village with a population of about 1800, is located in Cuyahoga County, six miles southeast of Cleveland. The village is situated on Tinker's Creek; a tributary of the Cuyahoga River which it joins about five miles west of the village. The topography is dissected by several ravines formed by small tributaries of Tinker's Creek and the general drainage is in a southwesterly direction.

The village is at present provided with a public water supply obtained from the city of Cleveland and has a few paved streets and several short storm sewers. Recently a bond issue has been voted for the installation of sewers and sewage treatment works.

Previous Actions of the State Board of Health. In May 1912, the State Board of Health considered plans for a proposed system of combined sewers for the village, prepared by Mr. C. W. Courtney, consulting engineer of Cleveland. Approval of this system was withheld and the village officials and their engineer were informed that "the Board is of the opinion that where purification of the sewage is required it is advisable to install a separate system of sewers." Advice was also given at this time relating to certain features requiring attention in the design of combined sewers.

Proposed Sewerage. The plans of the consulting engineer recently submitted provide for a system of combined sewers similar in all respects to that shown on the plans considered by the Board in May 1912. The plans do not include details of sewage treatment works which will be required to avoid a nuisance in Tinker's Creek. The sewers will cover practically all the built up portions of the village and will be laid out in two main districts serving the northwesterly and southeasterly portions, respectively. A main sewer from each district, 24 inches in diameter, leads to a ravine which carries a small tributary of Tinker's Creek. The entire flow of storm water and sewage will be carried by these 24-inch lines and each line is provided with an overflow manhole for diverting the excess storm flow direct to the small stream in the ravine referred to.

The sewer system comprises 5.4 miles of sewers, ranging in size from 10 inches to 24 inches in diameter as follows:

10-inch	10,000 feet
12-inch	7,000 feet
15-inch	6,000 feet
18-inch	1,000 feet
20-inch	600 feet
24-inch	4,000 feet

The sewers will be provided with manholes at all changes of grade and direction and at dead ends flushing manholes will be placed for cleansing the sewers. Due to the large size of the sewers relatively large amounts of water will be required for this purpose.

The sewers will accommodate a population of 1300 from which sewage may be expected within a few years. It is also proposed to provide storm drainage for 250 acres, which is the area covered by the sewers, as well as removal of roof water, cistern overflow, etc. The storm water overflows as shown on the plans are located west of the built up portion of the village and well removed from habitations. The design of the overflow is such that a flow of 2,000,000 gallons per 24 hours in each sewer is required to cause operation of the overflows. At such times the minimum dilution will be 20 to 1 on a basis of a sewage flow of 100,000 gallons in each district. From the points of overflow the dry weather flow will be carried to the site for treatment works through 10-inch and 12-inch sewer lines.

The design of combined sewers for Bedford appears poorly chosen in view of a number of considerations. The topography of the locality is such that the surface drainage will naturally be removed quite rapidly by means of the numerous ravines. Thus the conditions permit of the installation of short storm sewers. The flushing of the combined sewers will require large quantities of water and constant attention on the part of the operator. The excessive flow during and following storms which will reach the sewage treatment works with the use of combined sewers will be detrimental to the operation of the works, and may seriously interfere with the efficiency of the devices. Only constant and careful attention can obviate this trouble. It is not to be expected that such attention will be secured in a village the size of Bedford.

Proposed Location of Sewage Treatment Works. The engineers for the village propose to locate the sewage treatment works at a point in the valley of a small tributary of Tinker's Creek in the westerly portion of the village. Owing to the nature of the surrounding topography and the embankments of the Pennsylvania and Wheeling & Lake Erie Railroads northeast of the site, it is probable that the future building operations within one-quarter mile will be unimportant. The hilliness of the site will require considerable grading to permit the construction of the plant and this is probably its most objectionable feature. The location is well shielded by elevated ground from houses located about 1,000 feet north of the site. In a downstream direction from the proposed site Tinker's Creek flows through a narrow and deep valley which affords no suitable area for the construction of treatment works. The proposed site, therefore, represents probably the only available location.

ACTIONS OF THE BOARD.

At a meeting of the State Board of Health held February 20, 1913, the site for proposed sewage treatment works for Bedford, as shown on plans prepared by Messrs. E. J. Watson and C. W. Courtney, engineers for the village, and submitted by Mr. L. R. Landfear, village solicitor, January 20, 1913, was approved subject to the condition that it be utilized for the construction of sewage treatment works prior to January 1, 1915.

The plans for a system of combined sewers for Bedford, prepared by the above named engineers and submitted by the village solicitor on January 20, 1913, were referred to a committee consisting of the engineering committee and the chief engineer, for further report.

At a meeting held March 20, 1913, the general plans for proposed sewerage for Bedford, prepared by Messrs. W. J. Watson and C. W. Courtney, engineers for the village, and submitted by Mr. L. R. Landfear, village solicitor, January 20, 1913, were approved subject to the following conditions:

1st. That plans for sewage treatment works shall be submitted to the State Board of Health and that such works shall be installed before the proposed sewer system is used for sanitary purposes;

2nd. That before contracts for the proposed sewers are awarded detailed plans, satisfactory to the engineer of the State Board of Health, shall be submitted showing sizes, grades, and location of sewers; design of manholes, inlets or catch basins, storm water overflows and interceptor connections; and other features of the system;

3rd. That the village shall maintain regular inspection of the storm water overflows and interceptor connections to prevent and correct stoppage of the intercepting sewers;

4th. That the storm water overflows shall be extended when deemed necessary by the State Board of Health; and,

5th. That this approval shall be void unless detailed plans complying with the foregoing first and second conditions shall have been submitted prior to September 1, 1913, and unless the sewers and treatment works shall have been installed prior to August 1, 1914.

On May 13, 1913, plans for a proposed sewage treatment plant for Bedford were received from Mr. L. R. Landfear, village solicitor. The plans were prepared by Messrs. W. J. Watson and C. W. Courtney, engineers for the village, with Mr. R. Winthrop Pratt, as consulting engineer. The plans were referred to the engineering department and after examination the following report was submitted:

PROPOSED SEWAGE TREATMENT PLANT.

The plans for sewerage approved by the Board in March, 1913, included 5.4 miles of sewers ranging in size from 10 inches to 24 inches in diameter, which will cover an area of 250 acres and provide sewerage facilities for an ultimate population of 1,300. At the present time a portion of the system will be constructed which will make a population of 800 accessible to the sewers. The sewage treatment plant is designed to serve a population of 1,500. The dry weather sewage flow estimated from the water consumption will be 60 gallons per capita which with 1,500 persons connected is equivalent to 90,000 gallons per day. The low water consumption is due to the excessive use of the water for domestic purposes and the general use of meters.

The plans for a sewage treatment plant provide for a screen and grit chamber, settling tanks, a dosing chamber, contact filters, and intermittent sand filters. It is proposed to omit the construction of the sand filters in the immediate installation.

Site. The site which will be utilized for the plant has been approved by the Board in February 1913. It is a tract of five acres located in the valley of a small tributary of Tinker's Creek in the western portion of the village. It is entirely satisfactory for the purpose and with proper operation of the plant no complaint should arise. At the present time there are no dwellings within 1,000 feet of the site, and owing to the nature of the surrounding territory and the embankments of railroads northeast of the site, it is probable that future building operations within one-quarter of a mile will be unimportant.

Screen and Grit Chamber. For the interception of floating material and grit which may be expected with the use of combined sewers, a screen and grit chamber is provided as a preliminary treatment of the sewage flow. The sewage reaches the chamber through an intercepting sewer which may discharge a maximum of 4.5 second feet, or 3 million gallons per twenty-four hours when flowing full. The screen and grit chamber is an open concrete structure 36 feet 10 inches by 7 feet 6 inches divided longitudinally into two compartments. The upper end of the grit chamber contains four screens two of which are placed in each compartment. Either or both compartments may be utilized depending upon the sewage flow. The dry weather flow may be by-passed from a point behind the screens to the dosing chamber through a 6-inch line. The floor of the chamber slopes slightly toward the outlet end, and its average depth is 2 feet. The depth of flow is controlled by stop planks at the outlet end, and thus the capacity of the grit chamber may be varied to correspond to the sewage flow. With the maximum storm flow, 4.6 cubic feet per second, one minute retention with a velocity of 30 feet per minute will be afforded by using both compartments of the grit chamber and maintaining an average depth of flow of 1.5 feet. This may be accomplished by setting the stop planks at the outlet end. How ever, with this excessive flow the other devices of the treatment works will be overworked and a by-pass to the outlet should be provided. Adjustment of the grit chamber may be made for lower flows and finally the dry weather flow may be by-passed to the dosing chamber. Owing to the shallowness of the grit chamber, it will be necessary to remove the grit deposits frequently to prevent a decrease in its retention period.

Settling Tanks. From the grit chamber the sewage flows to two open concrete settling tanks of the two-story type with a separate sewage and sludge compartment. Each tank is 612 feet in width and 20 feet in length and has a sludge well, the bottom of which is 12.25 feet below the flow line of the tanks. The sedimentation compartment in each tank extends longitudinally along either side providing for the passage of the sewage along one side and its return along the other. Baffles are properly placed to distribute the flow. The sedimentation compartments of each tank have a capacity of 3,000 gallons, the total settling capacity providing a period of retention of 1.6 hours with a sewage flow of 90,000 gallons per day. When the sewage flow is 3 million gallons per day, which is the capacity of the main sewer reaching the plant, the period of retention will be only three minutes. At such times the tanks should be by-passed, and for this purpose a by-pass line to the stream should be provided. The sludge compartments have a capacity of 575 cubic feet for each tank which represents a total sludge retention capacity of five months. For sludge removal piping is provided through which the deposits may be discharged under a static head of 7 feet.

Sludge Filter. For drainage and drying of the sludge a single filter 18 feet by 70 feet in plan is provided. The area is sufficient for a population of 3,500. The plans provide for the discharge of the sludge at one end of the elongated filter by which means an improper distribution of the sludge will probably result. The area should be divided into two units with a point of discharge for each. The filtering material shown on the plans is one foot in depth and consists of one foot of cinders covered with two inches of sand. A much better filter medium would be secured by the use of a sand layer one foot in thickness underlaid by gravel.

Dosing Chamber. The effluent from the settling tanks flows to a covered concrete dosing chamber 15 feet by 60 feet in plan, internal dimensions. The depth to the flow line is 2.5 feet, and the capacity is, therefore, 17,000 gallons. Automatic siphons are placed to provide for the discharge of the contents of the dosing chamber in sequence to the contact filters.

Contact Filters. For the intermediate treatment of the sewage three units of contact filters are to be constructed. These will be built of reinforced concrete and the filtering material will consist of cinders 5 feet in depth. Each unit is 40 feet by 44 feet in plan, the total area of the three units being 5,280 square feet. On the basis of 33 1-3 percent voids in the filtering material the available holding capacity of each unit is 22,000 gallons. The contents of the dosing chamber will fill the contact filters to a depth of 3.8 feet. On the basis of a population tributary of 1,500 the contact filter capacity is equivalent to 2,470 persons per acre foot. While this figure is rather high the low per capita sewage flow produces a more satisfactory rate. With a flow of 90,000 gallons per day the rate of operation will be 742,000 gallons per acre per day and 92 gallons per cubic yard of filtering material. The sewage is discharged onto the contact filters through two transverse lines of vitrified pipe laid just below the surface of the filtering material. The underdrainage system consists of split tile discharging into a central channel. Discharging apparatus will be provided to retain the dose in the filter for a predetermined time and to discharge it to the intermittent sand filters or to the effluent drain.

Intermittent Sand Filters. Although included in the plans the intermittent sand filters will not be constructed immediately. The general plans provide for two units each 96 feet by 50 feet in plan, the total being 9,600 square feet or 0.22 acre. With a sewage flow of 90,000 gallons per day, the rate of operation will be 400,000 gallons per acre per day. The contact filter effluent should be properly treated at this rate.

Disposal of Effluent. The stream which will receive the effluent from the sewage treatment plant is a small tributary of Tinker's Creek, having a watershed area of less than one square mile. The stream practically ceases to flow during dry weather and consequently a nuisance would result if crude sewage or an improperly treated effluent should be discharged at such periods. Neither the small tributary nor Tinker's Creek are used for any purpose between the point of effluent discharge and the Cuyahoga River.

SUMMARY.

The proposed sewage treatment plant for Bedford will serve a population of 1,500 which will not become tributary for several years. The effluent from the contact filters will be partially purified and will probably not create objectionable conditions in the stream receiving it. At a later date when the financial condition of the village will permit the final intermittent filters will be constructed which will insure the quality of the effluent. With the use of combined sewers an excessive flow may be expected following storms. In the design of the plant no provision has been made for this excessive flow which may bring about a damaging effect to the different devices. By-pass lines should be installed for emergency use. Revisions in the design would be desirable to provide for a more suitable filtering material for the sludge and an improvement in the underdrainage system of the contact filters by the use of coarse gravel immediately surrounding the underdrains.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the plans for a proposed sewage treatment plant for Bedford submitted by Mr. L. R. Landfear, village solicitor, May 13, 1913, jointly prepared by Messrs. W. J. Watson and C. W. Courtney, engineers for the village, and Mr. R. Winthrop Pratt, consulting engineer, were approved subject to the following conditions:

1st. That the design of the proposed sewage treatment plant be modified by the addition of by-pass facilities to be used during excessive storm flows; and that revised plans incorporating such features, satisfactory to the engineer of the State Board of Health, be submitted;

2nd. That all grades of filtering material be approved by the engineer of the State Board of Health before the material is placed, and that sand be used as a filtering material in the sludge filter, and graded gravel or stone be used as a support for the contact material;

3rd. That a competent operator be employed to attend to the maintenance and operation of the intercepting sewers and sewage treatment plant;

4th. That intermittent sand filters, as shown on the plans, be constructed when deemed necessary by the State Board of Health; and,

5th. That this approval shall be void unless the proposed sewage treatment plant shall have been constructed prior to August 1, 1914.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT WORKS FOR BEXLEY.

On January 6, 1913, a communication was received from Mr. George E. Fry, clerk of the village of Bexley, requesting approval of the location for proposed sewage treatment works for the village. On January 7, 1913, the chief engineer, accompanied by Mr. A. Elliott Kimberly, consulting engineer for the village, visited Bexley and examined the proposed location. On January 15, 1913, the consulting engineer submitted a plan showing the location and the topography of the site.

At a meeting of the State Board of Health held January 22, 1913, a report of the chief engineer upon a site for proposed sewage treatment works for Bexley was considered, the said report containing the recommendation that the site be approved. At this meeting of the Board a committee composed of Mr. Henry C. Taylor, Mr. G. W. Williams, and Mr. M. E. Brown, owners of property in the vicinity of the site, presented a protest against the utilization of the location for sewage treatment works. A committee of officials of the village of Bexley comprising Mr. F. D. Chamberlin, mayor; Mr. DeWitt C. Jones, village solicitor; Mr. A. Elliott Kimberly, consulting engineer; and Mr. F. L. Chase also appeared before the Board and requested that the Board approve the proposed site. The Board took no action approving the proposed site but referred the question to Dr. Frank Warner, member of the Board, as a committee to investigate the report.

On February 7, 1913, the above named committee conferred with the consulting engineer regarding the proposed location and contemplated plans for sewage treatment works. On February 14th the committee visited the proposed site and investigated its suitability for the location of sewage treatment works. On February 20th a second conference with the consulting engineer was held, and on February 24th the committee, accompanied by the consulting engineer and chief engineer of the Board, again inspected the proposed site and the land in its vicinity. The following report was made:

Bexley, a village with a population of approximately 800, is located immediately east of and contiguous to the city of Columbus in Franklin County. The topography is undulating, the drainage from the main portion of the village flowing in a westerly direction to Alum Creek which flows between Bexley and Columbus. The village covers an area of approximately 1.2 square miles, its population representing an average of one person per acre. At the present time the village is unprovided with municipal improvements, although bond issues have been voted for the installation of a public water supply, a separate system of sewers, and sewage treatment works.

Proposed Location. Although plans for a sewerage system have not been prepared, it is intended to convey the sewage to a point in the southwesterly portion of the village near Alum Creek, from which point a main outfall sewer will be carried south to the site for sewage treatment works. The site selected by the village is a tract 8.7 acres in area, having a width of 220 feet and a length of 1720 feet. It extends in an easterly and westerly direction between Alum Creek and the Winchester Pike, and is over 900 feet south of Livingston Avenue, the southerly corporation line of the village. It is proposed to utilize the westerly portion of the tract by locating a plant some 600 feet east of Alum Creek. The plant will, therefore, be about 1,000 feet west of the Winchester Pike and 1,000 feet south of Livingston Avenue.

The location is favorable with regard to surrounding habitations, as there are no houses within 800 feet of the proposed location of the plant. Within 1,000 feet there are three farm houses, all east of the site, one of which will be purchased by the village. The westerly bank of Alum Creek, toward the city of Columbus, is rather precipitous and will shield the plant in this direction. As regards the elevation of the site, the point at which the plant will be located is approximately seven feet above low water in Alum Creek and three feet below high water. The plant will be protected by suitable levees.

Regarding the design of the treatment works, no details have been worked out but it is tentatively planned to provide a two-story settling tank and cinder contact filters, the material being carried one foot above the flow line of the filters. The odors will thus be greatly reduced.

Other Available Locations. An examination of the valley of Alum Creek in the vicinity of the proposed location revealed the fact that no site, other than that selected, admitting development at a permissible cost can be found within a reasonable distance of the village of Bexley. It is impracticable to locate a plant north of Livingston Avenue or between Livingston Avenue and the proposed site. In a southerly direction the bottom land of the creek on its easterly side narrows and practically disappears at the entrance of Bliss Run, about one mile south of Livingston Avenue. On the westerly side of the creek there are available areas, but it is quite likely that with the use of inverted siphons to cross the creek, pumping of the sewage will be required to secure sufficient head through the treatment works. On the easterly side of Alum Creek below Bliss Run the valley of the stream remains narrow for a distance of about one mile and no suitable site exists. It is impracticable on the basis of cost of installation and operation to locate the sewage treatment works on the westerly side of Alum Creek or on the easterly side south of Bliss Run.

At a meeting of the State Board of Health held March 20, 1913, this site proposed for sewage treatment works for Bexley, shown on a plan submitted by Mr. A. Elliott Kimberly, consulting engineer, January 15, 1913, was approved subject to the condition that plans for the proposed sewage treatment works be submitted to the Board prior to September 1, 1913, and the works be installed prior to October 1, 1914.

On April 11, 1913, plans and specifications for proposed sewerage and sewage treatment works for Bexley were received from Mr. A. Elliott Kimberly, consulting engineer for the village. The plans were referred to the engineering department for examination. The plans were examined in the engineering department and the following report was made:

PROPOSED SEWERAGE.

In designing the sewer system of the village provision has been made for an ultimate population of 25,000 which will be reached when the population per acre is 33. The treatment works for the disposal of the sewage as installed immediately will provide for a population of 2,000 and the plant may be readily increased to serve a population of 4,000. It is expected that before the village will reach this population it will have become annexed to the city of Columbus and its sewerage system connected with a comprehensive system for the Alum Creek drainage area. It would, therefore, appear that the provisions are ample.

The plans of the consulting engineer provide for the installation of a complete system of sanitary sewers which will ultimately cover the entire area of the village. The immediate installation will sewer approximately one square mile of the area. The plans provide for the ultimate installation of about eight miles of sewers, varying in size from about 8 to 18 inches. They will be constructed of vitrified pipe with 3-foot lengths, and the joints will be sealed with cement or an asphaltic compound to prevent infiltration of ground water. Owing to the topography of the village it has been necessary to design grades which in numerous cases will produce velocities of less than 2 feet per second. Adequate flushing facilities to prevent the stranding of solid matter are provided by sixteen flushing manholes located at the dead ends of the sewers. The small population per acre in certain portions of the village will produce a flow in the sewers insufficient to prevent the stranding of solid matters. With the low grades prevailing, sewer flushing will be necessary and it is important that provision be made for the water supply prior to the use of the sewers.

PROPOSED SEWAGE TREATMENT WORKS.

The design of the consulting engineer provides for the installation of sewage treatment works of a capacity to serve 2,000 persons, or a sewage flow of 160,000 gallons. The preliminary treatment devices will have a capacity for 4,000 persons and the secondary devices may readily be increased to this capacity by duplication at a later date. The features of the plant include a screen chamber, a two-story settling tank, a sludge filter and contact filters.

Screen and By-pass Chamber. The 18-inch trunk sewer from the village will discharge into a covered concrete screen chamber containing a bar screen with one-inch openings. Sewage flows, sufficient to produce a depth of flow of three inches or more over the weirs of the settling tank, will automatically discharge over a by-pass weir placed in the screen chamber. By means of a shear gate the entire flow of unscreened sewage may be by-passed into Alum Creek.

Settling Tank. The screened sewage will be conveyed through a 15-inch line to a settling tank of the two-story type. The tanks will be constructed of reinforced concrete and covered entirely with a concrete roof to prevent dissemination of odors. The sludge compartment is circular in plan and has a depth from the flow line to the sludge pit of 25.75 feet. The settling compartment has a capacity of 22,000 gallons representing a period of flow of 1.7 hours with a sewage flow of 320,000 gallons per day, produced by a population tributary of 4,000. The sludge compartment has a capacity of 2,200 cubic feet which provides sludge retention for three months with 4,000 tributary. Baffles are placed in the inlet and outlet ends of the sedimentation compartment and sludge piping is provided for the removal of the settled solids from the sludge compartment.

Sludge Filter. To receive the sludge discharged at intervals from the tank, a filter with an area of 630 square feet will be constructed near the settling tank. The area is sufficient to serve 2,000 persons which is the initial capacity of the plant. The head for the removal of sludge, 5 to 6 feet, is sufficient to guarantee successful operation. The filtering material selected is one-foot of cinder breeze which rests upon the underdrainage system. The use of cinder breeze for this purpose is less desirable than sand of a coarse grade. It is proposed to distribute the sludge by means of a hose connection, the success of which can be demonstrated only by trial.

Contact Filters. The effluent from the settling tank will pass through a central control chamber from which it will automatically be diverted in sequence to the contact filters. At this point a by-pass is provided, by means of which the settled effluent may be discharged into Alum Creek. The ultimate design is for eight units, four of which will be installed immediately. Each unit has an area of 2,915 square feet, the total area of the four units being .268. The depth of the filtering material to the flow line is 4 feet. With a sewage flow of 160,000 gallons per day and a population tributary of 2,000, the rate of operation will be 1,860 persons per acre foot, 150,000 gallons per acre foot or 93 gallons per cubic yard of filtering material. Assuming 33 per cent voids there will be 1 1-3 cycles of operation per 24 hours.

The filtering material selected will consist of cinders ranging in size from ½ to 1½ inches. A 6-inch layer surrounding the underdrains will have a size of 1½ to 4 inches. The use of the cinders as a contact material is satisfactory but it would appear advisable to provide for a better grade of material such as stone for the underdrainage or foundation. To prevent the appearance of sewage at the surface of the filters and also to avoid production of odors the filtering material will be covered with a 6-inch layer of clean coarse gravel.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held May 22, 1913, the plans and specifications for proposed sewerage and sewage treatment works for Bexley, received from Mr. A. Elliott Kimberly, consulting engineer, April 11, 1913, were approved subject to the following conditions:

1st. That no connections to the proposed sewers be permitted until,

a. The proposed sewage treatment works shall have been completed, and

b. Provision for sewer flushing shall have been made by the installation of a public water supply.

2nd. That the village council enact an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers, and providing for a proper official to supervise the maintenance of the sewers and treatment works, and that within two months after the completion of the sanitary sewers and treatment works, all existing connections in violation of the said ordinance be abandoned and removed;

3rd. That samples of all filtering material be submitted to and receive the approval of the Engineer of the State Board of Health;

4th. That details of automatic apparatus to control the operation of the contact filters be submitted to the State Board of Health;

5th. That the sewage treatment works be enlarged, or otherwise modified, when required by the State Board of Health;

6th. That this approval shall be void unless the proposed sewers and sewage treatment works shall have been installed prior to October 1, 1914.

The Mayor and Council were advised:

1st. That the working head of the treatment works be so increased or modified as to produce a free flow in the main trunk sewer and through the various devices of the plant; and,

2nd. That flat grades of the sewerage system and probable low stage flow will necessitate frequent flushing of sewers to prevent stoppages.

REPORT ON PROPOSED SEWER AND SEWAGE TREATMENT WORKS FOR THE BOARDMAN CENTRALIZED SCHOOL, BOARDMAN TOWNSHIP, MAHONING COUNTY.

On June 24, 1913, one of the engineers inspected the proposed location for sewage treatment works at the Boardman Centralized School. Details of the inspection may be found by consulting a report dated July 12, 1913. The plans submitted prior to the inspection were insufficient and it was impossible to secure the necessary information at the time of the visit. Definite instructions were given as to the proper procedure, and on September 9th, 1913, plans, together with a letter and information blank explaining the proposed installation, were received by the State Board of Health. The plans were submitted by The W. J. Scholl Company of Youngstown. After a review of the plans the following informal report was prepared and is herewith submitted:

Boardman Township, Mahoning County, several years ago installed a Centralized School, which is attended at the present time by approximately 300 pupils. The original school building was of wooden construction, but at the time of the centralization of the school a brick addition was constructed. The toilet facilities provided have been the ordinary outdoor closets and it is now the desire and intention of the local school board to install a system of sanitary plumbing.

The toilet facilities which will be included are 17 closets, 10 urinals, 2 lavatories, and two drinking fountains. The water will be supplied from a drilled well located about 25 feet to the north of the school building. Water will be pumped by means of a small gasoline pump and engine to a pressure tank which will supply the toilet facilities. It is estimated that the water consumption and sewage flow will be approximately 2,400 gallons each day.

Proposed Treatment Works. A 6-inch sewer will lead from the school building to a septic tank located to the southwest of the school. One tank is to be provided. The tank is 12 feet by 6 feet in plan and has a depth of 4.25 feet which gives a capacity of 2,295 gallons. The overflow from the tank is directly to the dosing chamber, which is 5.25 feet by 6 feet in plan and 0.75 feet in depth. In addition to this capacity it is provided on the plans that the flow line in the tanks proper will be increased by 9 inches before the siphons will discharge, which gives an added capacity to the dosing chamber. The total available capacity of the dosing chamber is 776 gallons. Two 4-inch siphons are provided in the dosing chamber and two hanging baffles are placed one within 1 foot 10 inches from the inlet end, and the other within 1 foot 10 inches of the outlet end in the septic tank.

The siphons will discharge through a 6-inch sewer to the sub-surface filters, two of which are provided. The area of each filter is 237.5 square feet. The total area is, therefore, 475 square feet and when the plant is carrying its full capacity of 2,400 gallons, the filters will operate at the rate of approximately 220,000 gallons per acre per day for 24 hours or 880,000 gallons per acre per day during the operation of the plant or 6 hours per day. The sewage will be distributed upon the surface of the filters by means of 6-inch tile with eight 4-inch laterals. The filtering material will have an average thickness of 3 feet 4 inches and is to be of coke. A concrete floor and division wall are shown on the plans. A single 6-inch underdrain is shown for each filter, with a vent pipe extending to the surface of the ground. The effluent will be discharged into a small ditch which passes along the side of the main road in front of the school building.

There are no water supplies within 300 feet of the proposed sewage treatment works and there is little probability that any detrimental effects will arise from the use of the proposed plant. The rate of filtration, however, is high and it would seem advisable to provide an increased area so that a staple effluent might be ensured.

ACTION.

October 9, 1913 (in accordance with the resolution adopted by the Board May 22, 1913), the Secretary approved plans for a proposed sewage treatment plant for the Boardman Centralized School, received from The W. J. Scholl Company of Youngstown, September 9, 1913, subject to the following conditions:

1st. That direct ventilation through the septic tank, dosing chamber, and filters and main ventilation stack of the building shall be provided;

2nd. That the plans shall be revised to provide a filter area of at least 2,000 square feet and that this area shall be installed in the construction of the proposed plant;

3rd. That the septic tank shall be cleaned at intervals not greater than two months during the school year and the material properly disposed of by burial; and, 4th. That this approval shall be void unless the proposed sewage treatment plant shall have been installed in accordance with the foregoing conditions of approval prior to June 1, 1914.

The W. J. Scholl Company was advised to revise the design of the septic tank by providing a floor sloped to a central sump from which the sludge may be pumped; and to provide a manhole in the sewer line leading from the school building.

REPORT ON PROPOSED SEWAGE TREATMENT WORKS FOR CANAL DOVER.

On January 16, 1913, general plans for proposed sewage treatment works for Canal Dover, prepared by Mr. George E. Arnold, city engineer, and Mr. R. W. Pratt, consulting engineer, were submitted to the State Board of Health for approval. Canal Dover has been visited by representatives of the engineering department with reference to the sewerage improvements on May 27, and October 23, 1912. After an examination of the plans by the engineering department, the following report was submitted:

Canal Dover is a city with a population of 6,621 in 1910, located in Tuscarawas County on the Tuscarawas River, just above its confluence with Sugar Creek. The city is built largely upon the bottom land in the valley of the river which is bordered on both sides by rather elevated ground. The built up portion of the city lies on both sides of the river, the smaller portion on the southerly side having a population of about 800. In the way of municipal improvements the city is provided with well paved streets, a public water supply, and a separate system of sewers.

PREVIOUS ACTIONS OF THE BOARD.

In 1900 plans for sanitary sewers with an outlet into the Tuscarawas River at a point below the C. & P. Railroad bridge were approved by the Board "subject to the condition that the village of Canal Dover, whenever required to do so by the State Board of Health should purify its sewage in a manner satisfactory to said Board."

In July 1912, the State Board of Health withheld approval of plans for sanitary sewers for district No. 3, and advised the city that plans for sewage treatment works would be required. In August 1912, the Board rescinded this action and voted to approve of proposed sanitary sewers for district No. 3, subject to the condition that plans for sewage treatment works be presented to the Board by November 15, 1912. Later in November 1912, this time limit was extended to January 15, 1913.

EXISTING SEWERAGE.

The present sewerage includes approximately 1 mile of storm sewers and 8.4 miles of sanitary sewers. Added to this will be 3.7 miles of sanitary sewers in district No. 3. Sanitary sewers are located entirely in that portion of the city lying northwest of the river and discharge through a single outlet 18 inches in diameter located, as has been stated, immediately south of the C. & P. Railroad bridge, which is the location approved by the Board in 1900. The sewerage system is used by approximately 5,000 persons and the sewage flow is roughly 500,000 gallons per day.

PROPOSED SEWAGE TREATMENT WORKS.

The plans of the city engineer and consulting engineer provide for the installation of sewage treatment works to serve a population of 10,000, or a sewage flow of 1,000,000 gallons per day. The plant comprises sedimentation tanks and contact filters.

Site. The location selected for the treatment works is a tract of land with an area of about 17 acres, situated immediately south of the mouth of Sugar Creek on the east side of the Tuscarawas River, between the river and the Ohio Canal. The site is thus surrounded on three sides by water which effectually protects it against encroachment. The average elevation of the site is 7 feet above normal level of the river, but somewhat lower than the extreme high stage of the stream. Diking will, therefore, be required. The site is about 4,000 feet south of the existing sewer outlet, and an extension of 4,400 feet of sewer will be required to convey the sewage to the plant. At the present time there are twelve residences within 1,000 feet of the proposed site and there is little likelihood of future growth.

Screen Chamber. The sewage before entering the sedimentation tank will pass through a screen chamber containing screens having open spaces of one inch. The screen chamber is centrally located between the inlet ends of the sedimentation tanks into either of which the sewage may be diverted.

Sedimentation Tanks. The design provides for the installation of two sedimentation tanks of the two-story type. The sedimentation compartments in each of the tanks have a capacity of 62,500 gallons. The total sedimentation capacity, therefore, provides a period of three hours with 1,000,000 gallons sewage flow. The capacity of the sludge compartment is such as to provide a retention of the sludge for a period of five months on a basis of 10,000 persons tributary. The tanks are to be constructed of reinforced-concrete throughout and will be covered by a reinforced concrete roof. Each unit is 50 feet in length and 21 feet in width and is divided longitudinally into two compartments so that the total length of flow is 100 feet. The bottoms of the sludge compartments of each tank are sloped to two sumps from which 12-inch cast iron sludge lines lead to the sludge filters.

Sludge Filters. Two sludge filters, each 100 by 25 feet in plan are provided. The total area is 5,000 square feet which allows one square foot to each two persons tributary. The character and depth of the filtering material is not specified or shown on the plans.

Contact Filters. For secondary treatment of the sewage single contact filters are provided. Eight units, each 100 feet square, with a total area of 1.83 acres, are shown. The effective depth of the filtering material will be 3 feet 9 inches so that the population tributary will be 1,500 per acre foot. While this figure is somewhat higher than is customary, a degree of purification satisfying the local conditions will no doubt be secured. Each set of four units will be controlled by centrally located automatic apparatus designed to fill and empty the filters allowing a suitable period for contact. On a basis of 1,000,000 gallons of sewage flow there will be 1⅓ cycles in one day's operation of the plant.

The contact filters will be constructed with reinforced concrete division walls 12 inches in thickness and made watertight. The filtering material will consist of stone, coke or slag. A distributing system is provided for the application of the sewage and an underdrainage system for its removal from the filters. It should be noted that the distributing system is an unnecessary and somewhat undesirable refinement.

Tuscarawas River. From the contact filters a 20-inch line will convey the effluent to an outlet into the river. The Tuscarawas River has a watershed area above Canal Dover of about 1,400 square miles upon which there is a population of 184,000, corresponding to 132 per square mile. The total population is about evenly divided between urban and rural. Assuming a minimum run-off of 0.03 second foot per square mile the minimum flow at Canal Dover is 42 second feet. It is apparent that the minimum flow of the river is sufficient to receive the effluent from contact filters serving 10,000 persons without the creation of an offensive condition, and during high stages the stream can satisfactorily dilute the effluent from the settling tanks.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held January 22, 1913, the general plans for proposed sewage treatment works for Canal Dover, prepared by Mr. George E. Arnold, city engineer and Mr. R. Winthrop Pratt, consulting engineer, submitted January 16, 1913, were approved subject to the following conditions:

1st. That detailed plans of the sewage treatment works incorporating all features be submitted to the State Board of Health before contracts are awarded for construction of the works;

2nd. That samples of filtering material for the contact and sludge filters be submitted to and receive the approval of the engineer of the State Board of Health before being placed;

3rd. That the city council appoint a competent operator to have charge of the plant, whose duties shall also include superintendence of the sewerage system;

4th. That this approval shall be void unless contracts for the installation of the proposed works shall have been made prior to July 1, 1913.

REPORT ON PROPOSED SEWERAGE FOR SEWER DISTRICT NO. 4, CANAL DOVER.

On January 21, and February 20, 1913, plans and profiles for proposed sanitary sewers for Sewer District No. 4, Canal Dover, were submitted by Mr. George E. Arnold, city engineer. The plans were referred to the engineering department and the following report submitted:

Water Supply. In August 1912, the Board approved a proposed additional water supply for Canal Dover, providing that the existing and proposed wells be protected from pollution by the provision of sanitary sewers in the district within 1,000 feet of the wells. The existing and proposed wells are located in Sewer District No. 4, and the proposed sewers will comply with the condition of approval mentioned.

EXISTING SEWERAGE.

The present sewerage of the city including Sewer District No. 3, comprises 12.1 miles of sanitary sewers and about 5,000 feet of storm sewers. The sanitary sewers discharge through 18-inch outlets into the Tuscarawas River in accordance with plans approved by the Board in 1900. As has been stated plans for sewage treatment have been prepared and it is the intention to abandon the existing outlet and divert the flow downstream to a suitable site for the works.

PROPOSED ADDITIONAL SEWERAGE.

The plans of the city engineer provide for the extension of the sewer system by the installation of sewerage in District No. 4, which comprises that portion of the city lying south of the Tuscarawas River. The population of the district is about 800 and its area is about 300 acres. The sewerage will include the following lengths: 8-inch, 17,250 feet; 10-inch, 3,200 feet; 12-inch, 7,600; total, 5.3 miles. The low point of the system will be almost opposite the existing sewer outlet and it is proposed to install pumping equipment at this point for the purpose of discharging the sewage through a cast iron force main some 700 feet in length connecting with the existing sewer system.

The proposed additional sewerage will provide much needed facilities in that portion of the city lying south of the river, and will tend to safeguard the public supply wells by making possible the abandonment of privies and cesspools within 1,000 feet of the wells.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held March 20, 1913, the plans and profiles for proposed sanitary sewers for Sewer District No. 4, Canal Dover, submitted by Mr. George E. Arnold, city engineer, on January 21st and February 20, 1913, were approved subject to the following conditions:

1st. That the village council by ordinance provide for the abandonment, disinfection and filling of all cesspools and privy vaults within 1,000 feet of any public supply wells, and for the installation of direct house connections to the sewers within three months after the completion of the proposed sewers, and that a certified copy of the said ordinance be submitted to the Secretary of the State Board of Health;

2nd. That all proposed sewers within 1,000 feet of any of the public supply wells be made watertight either by the use of cast iron pipe or by sealing the joints of the sewers with an asphaltic compound;

3rd. That detailed plans of the pumping equipment for lifting the sewage from the proposed system to the existing main sewer be submitted to the State Board of Health before contracts for its installation are awarded;

4th. That contracts for sewage treatment works, general plans for which were approved by the Board January 22, 1913, be awarded prior to July 1, 1913; and,

5th. That this approval shall be void after July 1, 1913, unless all of the foregoing conditions shall have been complied with prior to that date.

REPORT ON PROPOSED NEW SEWAGE TREATMENT PLANT FOR CANTON.

On May 27, 1913, general plans for a proposed sewage treatment plant for Canton, prepared by Mr. R. Winthrop Pratt, consulting engineer, were submitted by Mr. Ray F. Harbert, director of public service. The plans were referred to the engineering department and the following report was submitted:

Canton, a city with a population of 56,000, is located in Stark County between and just above the confluence of the east and west branches of Nimishillen Creek, which stream is a tributary of the Tuscarawas River. The city is provided with a rather complete system of sewers constructed on the separate plan. At the time the sewers were built in 1893 a sewage treatment plant was installed to prevent the pollution of Nimishillen Creek. This plant is still in existence, although its capacity is greatly overtaxed by the sewage flow.

PREVIOUS ACTION OF THE STATE BOARD OF HEALTH.

In 1910 the Board considered plans for the enlargement and improvement of the sewage treatment plant, and although these plans were approved the Board advised that a new site for the plant larger and farther removed from the city should be secured. In September 1911 the Board disapproved plans for sewerage for District No. 4, and the city was advised that the Board would request that a new sewage treatment plant be constructed on a site satisfactory to the State Board of Health. In October 1911, the State Board of Health approved a proposed location for a new sewage treatment plant in the valley of Nimishillen Creek about one mile below the existing plant. This site is known as the Moser tract.

In May 1912, the Board reconsidered its disapproval of proposed sewerage for District No. 4 and approved the same subject to conditions which required the installation of a new sewage treatment plant before the proposed sewers could be used. At this time also the Board reaffirmed its action of October 1911, approving the Moser tract as a site for a new sewage treatment plant. In taking this action it was understood that a plant comprising tanks and contact filters would be installed.

EXISTING SEWAGE TREATMENT PLANT.

The present sewage treatment plant at Canton is located in the extreme southerly portion of the city on Nimishillen Creek. The plant consists of open settling tanks designed to be used as chemical precipitation tanks. The total tank capacity is 700,000 gallons representing 5.5 hours period of retention with the present sewage flow of 3,000,000 gallons per day. The devices for handling the sludge are inadequate and the disposal of the sludge has created a serious nuisance. The plant itself causes odors which are complained of by persons living within 1,000 feet from the plant. The efficiency of the plant in preventing the pollution of Nimishillen Creek is also inadequate and during dry weather the stream is seriously contaminated.

PROPOSED NEW SEWAGE TREATMENT PLANT.

The general plans of the consulting engineer provide for the installation of a new sewage treatment plant upon the site approved by the State Board of Health October 18, 1911, and May 9, 1912. The plant will comprise a screen chamber, sedimentation tanks, sludge filters, and contact filters. The general design provides for a population tributary of 80,000 contributing an estimated sewage flow of 6,000,000 gallons or 75 gallons per capita. The present sewage flow, with a population of 33,000 tributary to the sewers, is about 3,000,000 gallons, equivalent to 90 gallons per capita. This volume of sewage will be received at the plant immediately after its construction, and with the addition of sewers in District No. 4, the flow will be increased.

Site. The Moser site, which has been approved by the State Board of Health, is located in the valley of Nimishillen Creek, its northerly boundary being three miles south of the center of the city and one mile south of the southerly corporation line. Its southerly boundary is three-fourths mile north of North Industry, a small village through which the creek passes. The city has purchased an area of 13.7 acres and has under option an additional contiguous area of 46 acres which lies on both sides of the creek and includes the stream channel. The total area purchased and under option lying east of the creek is 39 acres, which extends 3,900 feet along the stream and has an average width of 435 feet. The easterly boundary of the site will be formed by the embankment of the B. & O. Railroad which will assist in shielding the site from view in this direction. A county road which passes through the site parallel to the creek will be abandoned and a new road placed immediately east of the railroad.

The country surrounding the site is sparsely settled, although there are a few scattered dwellings within one mile. With a northerly wind odors from the plant may be carried to the village of North Industry, but inasmuch as the prevailing winds are southwesterly a nuisance arising from this cause would be occasional.

Screen Chamber. A 30-inch inverted siphon will convey the sewage from the existing works to the new plant. It will discharge into a concrete screen chamber 23 feet 6 inches long, divided longitudinally into two compartments, either of which may be in service. Two sets of screens will be provided.

Sedimentation Tanks. The sedimentation tanks are of the two-story type being separated into settling and sludge digestion compartments. They will be of reinforced concrete construction with the exception of the false bottoms of the sedimentation compartments which are to be constructed of timber to permit of their removal. The design does not include a cover for the tanks. Three units are provided which may be operated in series or in parallel. Each unit is 210 feet in length, 26 feet in width, and 24 feet in depth from the flow line to the sludge well. The total sedimentation capacity of the tanks is 794,000 gallons equialent to 3.2 hours' retention with a sewage flow of 6,000,000 gallons daily. Below the sedimentation compartments in each unit are eight sludge wells each 26 feet square with an inverted pyramidal bottom. The total sludge capacity of the three units is 130,000 cubic feet which will provide sludge retention for a population of 80,000 for a period of 310 days. Sludge piping is provided leading from each sludge well, thus permitting the removal of the material by gravity. The general design of the sedimentation tanks is generous and efficient clarification of the sewage should be accomplished. The sludge storage capacity is excessive but this cannot be considered as detrimental to the efficiency of the tanks. A cover should be provided to prevent odor dissemination.

Sludge Filters. The sludge drying bed as shown on plans is a single unit 621 feet by 70 feet. The sludge discharge line extends along one side of the filter, discharging at points 40 feet apart. The sludge filter area is 43,470 square feet, which is sufficient to serve a population of 130,000. The facilities for applying the sludge and for removing it from the filter do not provide ease of operation. The filter area should be subdivided into smaller units, to secure more flexibility in operation. The filtering material will be sand 18 inches to two feet in thickness.

Contact Filters. The settled sewage flows through an open distributing channel 4 feet wide by 2 feet deep on the top of the wall separating two rows of contact filters, of eight units each. The sewage will be diverted to each of the units in sequence by the manual operation of valves. The sixteen units have a total area of 326,232 square feet or about 7.5 acres and the depth of the filtering material is 5 feet. Upon the basis of a sewage flow of 6,000,000 gallons the rate of operation of the contact filters will be 800,000 gallons per acre per day, 160,000 gallons per acre foot per day, and 93 gallons per cubic yard of filtering material per day. With 80,000 persons tributary the population load will be 2,130 persons per acre foot. At the ultimate capacity there will be 1½ cycles of operation per day.

SUMMARY.

The general plans for a proposed new sewage treatment plant for Canton provide for an installation which will serve a population of 80,000, and a sewage flow of six million gallons daily. The type of the works is such that a non-putrescible effluent may be expected. Minor revisions in the design should be made and these incorporated in detailed plans to be submittted to the State Board of Health. The general features of the design are satisfactory.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, these general plans for a proposed new sewage treatment plant for Canton, prepared by Mr. R. Winthrop Pratt, consulting engineer, and submitted by Mr. Ray F. Harbert, director of public service, May 27, 1913, were approved subject to the following conditions:

1st. That complete detailed plans for the proposed new sewage treatment plant be submitted to and receive the approval of the State Board of Health; and,

2nd. That this approval shall be void unless the aforesaid detailed plans shall have been submitted prior to October 1, 1913, and the proposed sewage treatment plant shall have been constructed prior to January 1, 1915.

The authorities of the city of Canton were informed that in granting an approval of the general plans, the Board sanctioned the installation of a plant comprising as its essential features sedimentation tanks and contact filters at the site shown on the plans, but would hold in abeyance approval of details of the proposed plant pending the submission of complete detailed plans.

On October 20, 1913, detail plans for a proposed new sewage treatment plant for Canton were received from Mr. R. Winthrop Pratt, consulting engineer. On the same date a copy of a resolution, adopted by the city council, approving the said plans were received from Mr. Ray F. Harbert, director of public service. These plans were referred to the engineering department and the following report was submitted:

DETAIL PLANS FOR PROPOSED NEW SEWAGE TREATMENT PLANT.

The detail plans of the consulting engineer provide for the installation of a new sewage treatment plant on the so-called Moser site which had been previously approved by the State Board of Health October 18, 1911, and May 9, 1912. The present sewage flow contributed by an estimated population connected to the sewers of 33,000 is 3,000,000 gallons per day. Immediately upon completion of the plant a volume slightly in excess of this figure will be received. The plant is designed for an ultimate population of 80,000 contributing an estimated daily sewage flow of 6,000,000 gallons or 75 gallons per capita. It is estimated that the ultimate population and sewage flow will be realized in 1930. The probable life of the plant without enlargement is, therefore, fifteen years.

The main features of the design includes a screen chamber, grit chamber, sedimentation tank, sludge filters and contact filters. In the adoption of this design it is the aim to provide for the discharge of a non-putrescible effluent into Nimishillen Creek.

Site. The Moser site, which will be utilized for the plant, has been previously approved by the Board. As shown on the detail plans the site has an area of sixteen acres and is completely occupied by the plant to be installed immediately. Without the acquirement of additional land, therefore, no enlargement of the plant will be possible. It would appear advisable for the city to secure sufficient additional area to provide for a reasonable enlargement, before the proposed plant is constructed. A county road forms the entire easterly boundary of the site. A railroad embankment parallels this road about 100 feet to the east. In order to avoid complaint from persons using the county road it would be desirable to transfer its location to a line immediately east of the railroad embankment. The site will be protected from floods by a levee extending above high water elevation of Nimishillen Creek.

Screen and Grit Chamber. The sewage will be carried from the existing treatment plant to the new plant through a 30-inch cast iron siphon. The siphon discharges into a screen chamber and thence passes through a grit chamber before it enters the sedimentation tanks. The screen chamber is an open concrete structure divided longitudinally into two compartments, either of which may receive the flow. In each compartment two bar screens with 1¾ inch and ¾ inch open spaces will be placed.

The grit chamber consists of an extension of the screen chamber and is also divided longitudinally into two compartments each 40 feet by 6 feet in plan and 2.5 feet in effective depth. Each compartment of the grit chamber is provided with an adjustable false bottom to permit control of the velocity and retention period in passage through the chamber. With the false bottom of one compartment adjusted for maximum capacity a period of retention of one minute and a velocity of flow of 40 feet minute will be provided for a sewage flow of 8.6 million gallons per twenty-four hours. With the false bottom adjusted to minimum capacity the average sewage flow will pass the chamber with a velocity of about 3 feet per second. It will, therefore, be noted that considerable elasticity in operation is provided. The grit will be collected in the bottom of the chamber between cross baffles and will not encroach upon the capacity of the flowing portions. The use of a grit chamber as a device for treatment of sewage from sanitary sewers is somewhat unusual but it is claimed by the consulting engineer to be a necessary refinement due to the infiltration of quick sand through the joints of the sewers.

Sedimentation Tanks. From the grit chambers the sewage will pass through sedimentation tanks of the two-story type, in which the greater portion of the suspended solids will be collected. The tanks are in three units, each 211.5 feet by 26 feet in plan with a total depth to the bottoms of the sludge compartments of 27 feet. Two sedimentation compartments in each unit extend longitudinally through the tank and are provided with sloping false bottoms separating the flowing sewage from the sludge digestion chamber below. The inlet and outlet ends are provided with troughs and stop planks so that the direction of flow through any unit may be reversed. This will assist in equal deposition of sludge. The total sedimentation capacity of the tanks is 789,000 gallons, which at an average sewage flow of 6,000,000 gallons per 24 hours, supplies a retention period of 3.15 hours. The maximum hourly sewage flow will pass the tanks in 2.4 hours. Each unit is divided by cross walls into eight sludge wells with pyramidal bottoms, each 26 feet square in plan. The total sludge storage capacity is 120,000 cubic feet, which on the basis of a population of 80,000 tributary to sanitary sewers provides storage of 286 days. This figure is unnecessarily large but not detrimental to the plant. Any sludge well may be cleaned by piping leading from it. The sludge will be removed by gravity into a pump pit from which it will be lifted to the sludge drying beds.

Sludge Filters. A total area of one acre divided into nine units is provided for sludge drying. The sludge will be discharged at two points on each unit to a depth of one foot. After drying it will be removed by means of small dump cars, transferred on an industrial railway track placed on the dividing walls of the units. The area of the sludge filters provides for a population load of 1.8 persons per square foot and is amply sufficient. The filtering material will consist of 12 inches of clean, coarse sand resting upon a layer of gravel, stone or slag surrounding the underdrains.

Contact Filters. The settled effluent from the tanks will flow by gravity through a covered concrete flume to the contact filters. A bypass leading from this flume provides for the emergency discharge of the settled sewage to the stream. These are laid out in 16 units, each with an approximate area of one-half acre; the total area provided is 7.9 acres. The depth of the filtering material and also the filling depth will vary from 4.25 to 5.25 feet and will average 4.75 feet. The total void capacity of the filters will be approximately four million gallons, which will provide for 1.5 cycles of operation per day. Based upon the ultimate population and sewage flow, the rates of the contact treatment will be 99 gallons per cubic yard, 160,000 gallons per acre foot, and 10,000 persons or 750,000 gallons per acre area. These rates are somewhat higher than those generally accepted for single contact treatment but are deemed proper by the consulting engineer on account of the well clarified effluent which will be secured from the tanks.

The sewage will be applied to each filter by means of hand operated gates through a line of 24-inch and 18-inch vitrified pipe, extending diagonally across the unit and placed just below the surface of the filtering material. Within a radius of four feet around this line fine screened clean graved ½ inch to 1 inch in size will be placed to restrict clogging. The filtering material proper will comprise crushed slag, cinders, stone or gravel ¾ to 1½ inches in size and 4 feet 3 inches in thickness. This material will be supported upon an underdrainage layer of coarse slag or coarse crushed stone 1½ to 3 inches in size. The effluent will be collected through underdrains of 6-inch half vitrified tile leading to a central collecting trough discharging through timed siphons. It will be noted that the operation of the contact filters will require constant attendance in their filling, but their discharge will be controlled by automatic apparatus. The effluent from all of the filters will be through a common outfall discharging into Nimishillen Creek.

Nimishillen Creek. Nimishillen Creek has a watershed above the proposed outfall of 153 square miles and its extreme low flow is roughly estimated at 7.5 second feet. Its mean summer flow is also roughly estimated at 20 second feet. It will, therefore, be seen that a non-putrescible effluent will be required at all times to prevent a nuisance. Below Canton the stream is not used as a source of water supply and the nearest surface supply is at Zanesville, about 100 miles below. The effect upon the water supply of Zanesville, resulting from the pollution of Nimishillen Creek at Canton is unimportant. The necessity for efficient sewage treatment is determined solely by the avoidance of a nuisance in the stream.

SUMMARY.

The detail plans for a proposed new sewage treatment plant for Canton are satisfactory and conform to the general plans previously approved by the Board. It appears advisable to secure an additional area for future extension of the plant and to relocate the county road at present bordering the site on the east. Provision should be made in construction of the plant for an office, laboratory and work shop, both for the convenience of the operator in charge and to facilitate accurate control.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the detail plans for a proposed new sewage treatment plant for Canton, received October 20, 1913, from Mr. R. Winthrop Pratt, consulting engineer, subject to the following conditions:

1st. That prior to the installation of the plant an additional area of at least ten acres adjoining the proposed site shall be purchased by the city to provide for future enlargement of the plant; and that the county road, forming the easterly boundary of the site, shall be relocated on a line east of the right-of-way of the Baltimore & Ohio Railroad;

2nd. That an office, laboratory, and workshop shall be provided and properly equipped at the site of the proposed plant to facilitate proper operation and control;

3rd. That samples of all grades of filtering material shall be submitted to and receive the approval of the Engineer of the State Board of Health before the material is placed; and,

4th. That this approval shall be void unless contracts for the installation of the proposed plant shall have been awarded prior to June 1, 1914.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT WORKS FOR CELINA.

On January 18, 1913, The W. J. Sherman Company, consulting engineers for Celina, submitted plans for proposed sewerage and sewage treatment works for the village. On July 29, 1912, the chief engineer visited Celina and investigated sewerage conditions and the proposed location for the sewage treatment works. The plans of the consulting engineer were examined in the engineering department and the following report was submitted:

Celina, a village with a population of 3,500 in 1900, is located in Mercer County on Beaver Creek at the northwesterly shore of Grand Reservoir. The village is provided with a public water supply and an inadequate system of storm sewers. The topography of the locality is flat, the drainage slowly following a general southwesterly direction to Beaver Creek, a tributary of the Wabash River.

In 1901 the village contemplated the installation of a complete sewerage system on the separate plan with sewage treatment works. Plans were approved by the Board August 23, 1901, but owing to the expense involved in the construction, the village abandoned the scheme. Subsequently, in connection with the paving of streets a number of storm sewers, discharging within the village into ditches tributary to Beaver Creek and in one instance into Grand Reservoir, were installed. These storm sewers have become misused to a large extent and at the outlets into the ditches serious nuisances are caused during dry weather. It is largely for the purpose of eliminating these nuisances, as well as to secure the advantages of adequate sewerage and drainage, that the proposed improvements are to be made.

PROPOSED SEWERAGE.

The plans of the consulting engineer provide for the installation of a separate system of sewers covering practically all the built up portions of the village. The storm water sewers will be laid out in two systems, one with an outlet into Grand Reservoir in the easterly portion of the village, and the other with an outlet into Beaver Creek southwest of the village. The storm water sewers range in size from 10 inches to 6 feet in diameter and comprise the following lengths:

Diameter. Inches.	*Length. Feet.*
10	1,350
12	9,090
15	5,715
18	6,105
20	1,860
24	1,575

27	1,635
30	1,335
36	4,620
54	780
60	1,590
72	2,940
Total	7.8 miles

The sanitary sewers will be constructed of vitrified pipe ranging in size from 8 inches to 24 inches in diameter, the entire system containing the following lengths:

Diameter. Inches.	*Length. Feet.*
8	64,875
10	525
12	2,295
15	1,050
18	4,868
24	670
Total	14.1 miles

The sewers will all be constructed with watertight joints as far as is possible by the use of cement or asphaltic compound. Manholes are placed at all changes of grade and direction and flush tanks are provided at dead ends to cleanse the sewers.

The entire system drains to a point in the southwesterly portion of the village where a pump well will be located to elevate the sewage to the treatment works. The pump well is a circular concrete structure, the bottom of which is 28 feet below the surface. It is 24 feet in diameter and its capacity to the invert of the sewers is 30,000 gallons. An overflow connecting to the main outfall sewer of the storm water system is placed at an elevation 6.5 feet above the invert of the sewer to which point the pump well has a capacity of 49,000 gallons. The sewage will be pumped by means of a motor driven, belt connected centrifugal pump, having a capacity of 470 gallons per minute. The pump will be placed in a dry well built in the pump well. The sewage will be forced through a line of 8-inch cast iron pipe about 2,500 feet in length, and the maximum life will be about 29.5 feet. At its entrance into the pump well the sewage will pass through a basket screen having spaces of ¾ inch.

PROPOSED SEWAGE TREATMENT WORKS.

The design of the proposed sewage treatment works provides for sedimentation tanks and intermittent sand filters. The plant is for an ultimate population tributary of 5,000, and the portion to be installed at present is for a population tributary of 2,500. The sewage flow for which the present installation will be made is 150,000 gallons daily, while ultimately 400,000 gallons daily may reach the plant.

Site. The location selected for the treatment works is at a point southwest of the village, immediately north of Beaver Creek and west of the right of way of the Lake Erie and Western Railroad. The site is well removed from the village and only one dwelling is within 1,000 feet of the proposed works. The elevation of the site is one foot above extreme high water of Beaver Creek so that no interference from floods need be anticipated.

Sedimentation Tanks. Two open reinforced concrete plain sedimentation tanks are to be installed for the preliminary treatment of the sewage. The tanks are each 70 feet in length and have capacities of 29,000 gallons and 36,000 gallons, respectively. The width of the tanks is 8 feet and 10 feet, respectively, and the depth to the sludge channels 7 feet 10 inches and 8 feet 4 inches, respectively. The inlet and outlet ends of the tanks are designed to distribute the flow properly, and baffles are also placed to utilize the capacity of the tank. The sludge which may accumulate will be removed from a point near the inlet end of the tanks through 12-inch cast iron drains leading to the sludge filter. The capacity of the tanks is such as to provide a period of retention of 10 hours, with a sewage flow of 150 gallons per day. Inasmuch, however, as the sewage will not be pumped steadily at this rate, some fluctuations will occur in the period of retention in the tanks. When pumpage is at 470 gallons per minute the retention period is only 2.3 hours. The pumps should be adjusted to such speed that a fairly constant flow through the tank will be provided.

Sludge Filter. Adjacent to the sedimentation tanks will be located a sludge filter with an area of 7,190 square feet. This area is sufficient to permit of the discharge of the entire contents of the larger tank with a flooding depth of 8 inches. The filtering material will comprise 12 inches of clean sand and 12 inches of graded gravel. The underdrainage system will connect to the main drain from the plant.

Dosing Chamber. The effluent from the settling tanks will flow by gravity to the dosing chamber, located in the center of a group of four sand filters. The dosing chamber is of reinforced concrete construction 21 by 27 feet in plan and 4 feet in depth to the flow line. Its capacity is, therefore, 17,000 gallons. The dosing chamber will contain ultimately eight sequence siphons, four of which will be placed immediately. The volume of the discharge is sufficient to flood one of the filter units to a depth of 1½ inches. The entire dosing chamber is to be housed by a neatly built brick structure to protect the apparatus from freezing.

Intermittent Filters. Four units of intermittent sand filters for the final treatment of the sewage will be constructed immediately and the plans provide for the ultimate installation of four additional units.

The units are each 100 by 180 feet in plan and 0.43 acre in area. The total area to be installed is therefore, 1.72 acres, which, with a sewage flow of 150,000 gallons per day, will be utilized at the rate of 87,000 gallons per acre per day, and with 2,500 persons connected to the sewer will have a total load of 1,450 per acre. The sewage will be distributed through a system of galvanized iron carriers, will pass through 24 inches of sand and 12 inches of graded gravel, and will be collected into the underdrainage system discharging through a main drain into Beaver Creek.

Beaver Creek. This stream which will receive the effluent from the works and also a large portion of the surface drainage from the village, serves as an outlet for the Grand Reservoir, and during a large portion of the year has little or no flow. It will, therefore, be necessary in order that a nuisance be avoided that the proposed treatment works be operated constantly and be maintained in good working condition.

ACTION OF THE BOARD.

At a meeting held January 22, 1913, the State Board of Health approved the plans for proposed systems of sanitary and storm water sewers and sewage treatment works for the village of Celina, submitted by The W. J. Sherman Company, consulting engineers, January 18, 1913, subject to the following conditions:

1st. That the proposed sewage treatment works be constructed before any connections to the sanitary sewers are permitted;

2nd. That the village council enact an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers, and providing for a proper official to supervise the maintenance of the sewers and treatment works; and that within two months after the completion of the sanitary sewers and treatment works, all existing sanitary connections to storm water sewers be abandoned;

3rd. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

4th. That the treatment works be enlarged or otherwise modified when required by the State Board of Health; and,

5th. That this approval shall be void unless the proposed works shall have been installed prior to January 1, 1914.

REPORT ON PROPOSED INTERCEPTING SEWER FOR DUCK CREEK INTERCEPTING SEWER DISTRICT, CINCINNATI.

On June 10, 1913, general plans for a proposed intercepting sewer for the Duck Creek Intercepting Sewer District, Cincinnati, were received from Mr. V. T. Price, director of public service. The plans were referred to the engineering department and on June 18, 1913, the chief engineer visited Cincinnati and investigated the proposed intercepting sewer. The followng report was submitted:

The Duck Creek Intercepting Sewer District, which comprises the principal portion of the drainage area of that stream, has an area of about 19 square miles, which includes a considerable area not at present within the corporation limits of Cincinnati. It lies northeast of the central portion of the city and includes all of a portion of the following suburban districts:

Walnut Hills,
Idlewild,
Norwood,
Hyde Park,
Oakley,
Madisonville,
Pleasant Ridge,
Kennedy Heights,
Silverton,
Deer Park,
Red Bank.

The present population is approximately 37,000, and it is estimated that the future growth of the district will be more rapid than the average for the city of Cincinnati.

Duck Creek rises in the southwesterly portion of the district and after flowing through the central portion enters the Little Miami River in the southeasterly portion. At the present time the stream and its tributaries receive sewage from a number of combined sewer outlets, many of which are poorly located. Inasmuch as the watershed area of the stream is 18.8 square miles and the dry weather flow at its mouth probably does not exceed 1.5 cubic feet per second, it will be realized that a serious nuisance is caused throughout its course. The construction of an intercepting sewer following the valley of the stream has long been required to abate the nuisance, but it has only been recently that the city of Cincinnati has taken up the problem with a view to its solution.

In permitting the omission of the construction of sewage treatment works for Pleasant Ridge and Kennedy Heights in January 1913, and in approving general plans for proposed sewerage for the Madisonville District in March 1913, the Board required that plans for an intercepting sewer in the valley of Duck Creek and for proper disposal of the sewage, be submitted prior to October 1, 1913.

General Plans for Intercepting Sewer. Preliminary surveys have been made to locate the proposed intercepting sewer and tentative sizes and grades have been fixed. It is proposed to sewer the entire stream for a length of about 7,500 feet along the upper portion of its course by constructing a combined sewer having a diameter varying from 7 feet to 15.5 feet. This sewer will terminate with an overflow near the Baltimore & Ohio Railroad bridge, at which point the dry weather flow will be discharged into the proposed intercepting sewer. The interceptor will be carried along the valley of Duck Creek to Red Bank, from which point an outfall sewer will be extended to the Little Miami River. The tentative plans for the intercepting sewer provide sizes varying from 24 inches to 48 inches in diameter, and grades which will insure good velocities. The total length of the proposed interceptor is 4.9 miles. Along its course it will intercept the dry weather flow from all existing and future sewers, at which points storm water overflows will be provided for by-passing excessive flows in Duck Creek.

Ultimately it is expected that a system of intercepting sewers to serve the entire city will be constructed along the Ohio River connecting with the proposed Duck Creek interceptor. Until this comprehensive development can be accomplished, it is proposed to discharge the sewage without treatment into the Little Miami River. The outlet shown on the general plans is located on the west side of the Little Miami River at a point six miles by water above its confluence with the Ohio River. The Little Miami River has a watershed area above the proposed outlet of 1,700 square miles, upon which there is a population of 60 per square mile. Its minimum flow according to meager figures furnished by the United States Geological Survey is 300 cubic feet per second. Unofficial measurements have indicated a somewhat smaller minimum flow. It may be estimated that the minimum flow is 150 cubic feet per second.

On the basis of the present population of the district, 37,000, this minimum flow of the stream represents a dilution of 4 cubic feet per second per 1,000 population. This is sufficient to prevent the production of a nuisance in the Little Miami River. It is reasonable to assume that a population of 50,000 may be served without a resultant nuisance in the river. Ultimately, however, the outlet into the Little Miami River must be abandoned or sewage treatment works provided, if a nuisance in the stream is to be avoided.

Below the proposed outlet the stream flows through a flood plain which has a width of about one mile. The territory near the stream is sparsely settled owing to the nature of the topography, and a mild nuisance in the river would probably not give rise to serious complaint. The stream enters the Ohio River at a point about one mile below the water works intake of the city of Cincinnati. During normal conditions of flow the discharge of the Little Miami River cannot affect the quality of the water supply. It has been found, however, by observation that under abnormal conditions, with a flood discharge of the Little Miami River and a normal flow of the Ohio River, reverse currents in the latter stream have occurred. At such times the discharge of the Little Miami River would probably reach the water works intake of Cincinnati. It must be recognized, however, that a very high dilution must obtain to bring about such conditions, and that the backflow from the Little Miami River would be of no poorer quality than frequently is obtained from the Ohio River. It is apparent that with efficient water purification works no fear of the quality of the water supply should be entertained. The question of discharging untreated sewage into the Little Miami

River should be considered primarily from the standpoint of the possibility of a nuisance.

Summarizing, therefore, it would appear that the untreated sewage from the Duck Creek interceptor can be safely discharged into the Little Miami River without causing a nuisance until the population tributary to the sewers shall have reached approximately 50,000. The danger to the water supply of the city is more or less imaginary and it is probable that no deleterious effect will be experienced. Before the tributary population of the district shall have reached 50,000, which will be about 1920, opportunity will be afforded for completing the contemplated system of intercepting sewers. If such a system is not installed before that time, sewage treatment works will be required to treat the dry weather discharge from the proposed Duck Creek intercepting sewer.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the general plans, received from Mr. V. T. Price, director of public service, June 10, 1913, for a proposed intercepting sewer for the Duck Creek Intercepting Sewer District, Cincinnati, with a temporary discharge into the Little Miami River, were approved subject to the following conditions:

1st. That prior to January 1, 1920, (at which time the tributary population to the proposed intercepting sewer is estimated at 50,000) the (a) proposed outlet shall be abandoned and the proposed intercepting sewer shall be extended to connect with an intercepting sewer along the north bank of the Ohio River, or (b) sewage treatment works of a design satisfactory to the State Board of Health shall be constructed to treat the dry weather flow of the proposed intercepting sewer before it is discharged into the Little Miami River;

2nd. That complete detailed plans of the proposed Duck Creek intercepting sewer shall be submitted to and receive the approval of the State Board of Health before contracts for the construction of the same shall have been awarded; and,

3rd. That this approval shall be void unless the aforesaid detailed plans shall have been submitted prior to October 1, 1913.

REPORT ON PROPOSED SEWERAGE FOR THE MADISONVILLE DISTRICT, CINCINNATI.

On February 21, 1913, general plans for sewerage for the Madisonville District, Cincinnati, were received from Mr. V. T. Price, director of public service. The plans were referred to the engineering department and on March 13, 1913, the Chief Engineer visited Cincinnati and investigated the proposed improvements. The following report was submitted:

In 1910 Madisonville, a residential suburb of Cincinnati in Hamilton County, was a city with a population of 5,193. In 1912 it was annexed to the city of Cincinnati, its population at that time being about 6,000. The Madisonville District is supplied with water from the Cincinnati water works but at the present time has no sewerage system. A few storm sewers which drain a portion of the district have been installed at various times, but furnish inadequate drainage facilities. Duck Creek flows in a southerly direction a short distance west of Madisonville, and the east fork of that stream passes through the easterly portion of the district.

As yet no detailed plans for the proposed sewers have been prepared by the city engineering department. General preliminary plans, which are subject to revision in the preparation of detailed plans, have been prepared to form a basis for a preliminary cost estimate. The general plans contain no details relative to grades, manholes, inlets, interceptor connections, et cetera. It is desired by the city authorities to obtain an approval of the general scheme of sewerage.

PROPOSED SEWERAGE.

The plans of the city engineer provide for the installation of a comprehensive system of combined sewers covering practically the entire area of the Madisonville District. When completely constructed the proposed sewers will drain an area of 1,305 acres, and on a basis of 20 persons per acre will receive sewage from a population of 26,000. The area of the Madisonville District at present is 975 acres. The entire area of the district is subdivided into fifteen subdistricts, the largest of which has an area of approximately 400 acres. The other fourteen districts vary in area from 10 to 70 acres. Eleven of the districts, having a total area of 495 acres and an ultimate population of 9,900, drain to the east fork of Duck Creek which passes through the easterly portion of the village. The storm water reaching the sewers during rainfall will pass into the stream through eleven storm water overflows, each of which serve a subdistrict. A system of intercepting sewers following the valley of the stream will divert the dry weather flow of sewage from the storm water outlets and carry it downstream to an intercepting sewer to be constructed in Duck Creek. Four of the subdistricts, having a total area of 480 acres and an ultimate population of 9,600, drain to Duck Creek or to a small tributary passing through the northwesterly portion of the district. A storm water overflow which will serve the largest of the districts, having an area of 400 acres, discharges into the small tributary referred to. The main sewers from the other three subdistricts will be carried to the contemplated Duck Creek interceptor at which point storm water overflows will discharge into Duck Creek. The following is a condensed table of information relative to the proposed sewerage.

GENERAL DATA ON PROPOSED SEWERAGE FOR MADISONVILLE, DISTRICT, CINCINNATI.

Sub-district.	Approximate Area in Acres.	Estimated Ultimate Population.[1]	Estimated Ultimate Dry Weather Flow, Gals. per Day.[2]	Approximate Length of Sewers, Feet.[3]	Diameter of Interceptor below Overflow in Inches.[4]	Diameter Storm Water Overflow, Inches.
1	10	200	20,000	2,010	24	none
2	30	600	60,000	4,700	18	none
3	40	800	80,000	5,620	24	none
4	400	8,000	800,000	55,740	18	87
5	50	1,000	100,000	8,100	12	42
6	25	500	50,000	3,300	15[5]	18
7	35	700	70,000	3,120	12	36
8	40	800	80,000	8,900	18[6]	36
9	55	1,100	110,000	9,660	12	36
10	35	700	70,000	5,600	12	30
11	65	1,300	130,000	8,720	....	54
12	65	1,300	130,000	7,300	18[7]	36
13	20	400	40,000	1,580	20[8]	18
14	35	700	70,000	4,740	20	30
15	70	1,400	140,000	12,500	24[9]	36
Total.......	975	19,500	1,950,000	26.7 miles	....	....

[1] At 20 persons per acre.

[2] At 100 gallons per capita.

[3] Approximate length intercepting sewers in valley of east fork Duck Creek, two miles.

[4] No overflows for sub-districts 1, 2, and 3. Tributary to Duck Creek interceptor direct.

[5] Receiving dry weather flow from sub-districts 5, 6, and 7.

[6] Receiving dry weather flow from sub-districts 5 to 9.

[7] Receiving dry weather flow from sub-districts 5, 6, 7, 8, 9, and 12.

[8] Receiving dry weather flow from sub-districts 5 to 13.

[9] Receiving dry weather flow from sub-districts 5 to 15.

Basis of Design of Sewers. As has been stated, the sewers for the Madisonville District are designed to supply drainage for 1,305 acres, upon which the ultimate population will be 26,000. The sewers in each of the subdistricts are designed to carry the maximum storm flow with 30 per cent runoff from the tributary area, and the intercepting sewers in the valley of the east fork of Duck Creek are designed to carry a flow of 300 gallons per capita when the district shall have become entirely built up. Upon this basis the mixture of sewage and storm water reaching the storm water overflows will represent a minimum dilution of 3 to 1 in case the dry weather flow is 100 gallons per capita. This is sufficient to insure that the first flush of the sewers following storms will be carried off in the intercepting sewers. At such times the runoff which produces the excess flow in the sewers will also increase the stream discharge which will add to the dilution of the mixture of sewage and storm water discharged into the stream.

Storm Water Overflows. The general plans provide for the installation of twelve storm water overflows serving twelve of the subdistricts, the other three subdistricts being directly tributary to the contemplated Duck Creek interceptor. Eleven of the storm water overflows, varying in size from 18 to 87 inches in diameter, discharge into the east fork of Duck Creek, while a single overflow, 7 feet 3 inches in diameter, discharges into the small tributary of Duck Creek in the northwesterly portion of the village. The location of the overflow tributary to the east fork is somewhat unsatisfactory as they enter the stream along its course through a populated portion of the district. The east fork has a watershed area above the first overflow of 3 square miles and above the lowest overflow of 4 square miles. The location of the overflow into the small tributary of Duck Creek is satisfactory as it is well removed from the built up districts. The area of the watershed of the stream above the overflow is 3.4 square miles.

Although the dry weather flow of both streams receiving the storm water overflows is slight, the operation of the overflows will be accompanied by a rise in the stream which will furnish dilution sufficient to prevent a nuisance. Below the points of overflow the streams have a fall of 25 to 60 feet per mile insuring a rapid flow.

Owing to the number and location of the proposed overflows, it is of the utmost necessity that provision be made for regular inspection and maintenance of the interceptor connections to prevent clogging and consequent discharge of the dry weather flow through the overflows.

Duck Creek and Its Tributaries. Duck Creek is a stream which rises in the easterly portion of the city of Cincinnati and is tributary to the Little Miami River at a point about four miles above the junction of the latter stream with the Ohio River. The watershed area of the stream is about 14.8 square miles upon which there is a population of approximately 37,000. The stream receives the greater part of the surface drainage and untreated sewage from a portion of the city of Norwood and from that part of the city including the Madisonville, Kennedy Heights, Oakley, Walnut Hills, Hyde Park, and Pleasant Ridge Districts. The stream also receives in an untreated condition a large portion of the sewage from the city of Norwood and the above named districts of Cincinnati. No stream flow measurements have been made to learn the discharge of Duck Creek. Judging from the size and nature of its watershed the dry weather flow at the mouth of the stream probably does not exceed 1.5 second feet. In connection with general plans to improve the sewage of Cincinnati, the engineering department is at present engaged in preliminary surveys for an intercepting sewer to follow the valley of Duck Creek and intercept the dry weather flow of all of the sewage at present discharged into the stream. Plans for this interceptor will probably be completed in the fall of 1913.

The east fork of Duck Creek which passes through the easterly portion of the Madisonville District enters the main stream at Red Bank, about two miles above the mouth of Duck Creek. Its watershed area is 4.5 square miles upon which there is a population of about 2,400, the greater portion of which is within the Madisonville District. Judging from the character and size of the watershed the dry weather flow of the stream does not exceed 0.5 second foot and in extremely dry seasons the stream flow probably fails entirely.

The small tributary of Duck Creek, passing through the northwesterly portion of the Madisonville District, has a watershed area of 3.7 square miles, upon which there is a population of 4,200, the most of which is within the Madisonville District. Judging from the character and extent of this watershed, the stream has a dry weather flow not to exceed 0.4 second foot.

It will be noted that Duck Creek and its tributaries are of insufficient volume to receive sewage without the production of a nuisance, and it is necessary to intercept the dry weather flow from the tributary districts and carry it to a suitable point for disposal.

SUMMARY.

The general plans for sewerage for the Madisonville District provide for the installation of a comprehensive system of combined sewers and a system of intercepting sewers to carry the dry weather flow. The selection of combined sewers is brought about largely by the use of combined sewers in practically all portions of the city of Cincinnati and the consequent lack of familiarity with sanitary sewers on the part of the people which might lead to misuse of sewers constructed on the separate plan. The use of combined sewers in the Madisonville District is not complicated by the necessity of installing sewage treatment works for the district as the contemplated Duck Creek interceptor will serve as an outlet for the dry weather flow.

The plans submitted are general and show no details of the proposed sewers. Detailed plans will be prepared prior to the award of contracts for the installation and such plans should be submitted for criticism. The general plans indicate that the proposed sewers will furnish adequate and satisfactory drainage and sewerage facilities, and aside from the rather unfavorable location of the overflows in the east fork of Duck Creek contain no objectionable features.

ACTION OF THE BOARD.

At a meeting held March 20, 1913, the State Board of Health approved the general plans for proposed sewerage for the Madisonville

District, Cincinnati, received from Mr. V. T. Price, director of public service, February 21, 1913, subject to the following conditions:

1st. That before contracts for the proposed sewers are awarded detailed plans, satisfactory to the Engineer of the State Board of Health, shall be submitted showing sizes, grades, and location of the sewers; design of manholes, inlets, storm water overflows, and interceptor connections; and other features of the system;

2nd. That the city shall maintain regular inspection of all storm water overflows and interceptor connections to prevent and correct stoppage of the intercepting sewers;

3rd. That any of the proposed storm water overflows shall be extended to a suitable point of discharge when deemed necessary by the State Board of Health;

4th. That before the proposed sewers are used for sanitary purposes an intercepting sewer in the valley of Duck Creek, and proper disposal of the sewage shall be provided; and,

5th. That this approval shall be void unless plans to comply with the foregoing first and fourth conditions shall have been submitted prior to October 1, 1913.

REPORT ON PROPOSED INTERCEPTING SEWER FOR THE MILL CREEK DISTRICT, CINCINNATI.

On August 12, 1913, general plans for a proposed intercepting sewer for the Mill Creek District, Cincinnati, were received from Mr. V. T. Price, director of public service. The plans were referred to the engineering department, and on August 26, 1913, the chief engineer visited Cincinnati and investigated the proposed improvement. The following report was submitted:

The sewers of Cincinnati, constructed principally on the combined plan, discharge into Mill Creek, Duck Creek, and the Ohio. Approximately 34 per cent. of the population is tributary to Mill Creek, 8 per cent. to Duck Creek, and 58 per cent. to the Ohio River.

Mill Creek, which passes through the city of Cincinnati, is a tributary of the Ohio River. Its watershed area is about 161 square miles, which includes 40 square miles within the present corporation limits of the city. The watershed extends about 22 miles north of the Ohio River and has an average width of about 7.3 miles. Mill Creek has for a number of years been one of the most grossly polluted streams in Ohio. It receives large volumes of industrial wastes from factories located along its course. Its valley forms one of the principal approaches to the city and is, therefore, largely given over to commercial activities. Above the city of Cincinnati the stream receives sewage from several villages. The most important pollution of Mill Creek, is, however, contributed within the city of Cincinnati. The present population within the city (including St. Bernard, Elmwood, and a portion of Norwood) tributary to Mill Creek is 140,000, and the population upon the watershed as a whole is 162,000 equivalent to 1,000 per square mile of watershed area. No flow measurements have been made to determine the discharge of the stream, but judging from the nature and size of the watershed the natural discharge during dry weather is not more than eight cubic feet per second.

This flow is increased largely by the wastes discharged into the stream, as is indicated by a low flow measurement, August 23, 1912, of 121 second feet which includes 50 second feet of waste water from the Miami and Erie Canal. During dry weather the flow has the appearance of concentrated sewage. In effect Mill Creek is an open sewer throughout the lower six or eight miles of its course.

In spite of the excessive pollution of Mill Creek the city of Cincinnati has, until recently, failed to formulate plans for the abatement of the unsanitary conditions. During the past year, however, the problem has been taken up and general plans have been prepared for the construction of an intercepting sewer to remove the wastes now discharging into the stream.

In determining the extent to which the improvements should be carried, two general propositions have been considered. One included the installation of an intercepting sewer to provide ultimately for the removal of sewage and industrial wastes from the entire drainage area of Mill Creek. The other proposition comprised the installation of an intercepting sewer to remove the sewage and industrial wastes from the area assumed to be included within the corporation limits of the city in 1950. Considerations of cost have led to the adoption of the latter plan.

Proposed Intercepting Sewer. Preliminary surveys have been made to establish the location, grades and sizes for the proposed intercepting sewer. It will extend along Mill Creek, paralleling the stream and crossing it at several points from the present outlet of the sanitary sewer system of Hartwell, now a portion of the city, to an outlet into the Ohio River, immediately west of the mouth of Mill Creek. The total length of the interceptor as planned will be 51,450 feet and it will be constructed with a section varying from 4 feet to 8 feet in diameter. Twenty-eight existing trunk sewers will be connected to the interceptor to divert the dry weather flow. Of these, five are sanitary sewers and twenty-three are combined sewers. Inverted siphons will be utilized for connections crossing the stream.

The capacity of the proposed intercepting sewer has been determined by estimating the quantities of domestic sewage, industrial wastes and ground water leakage, which will enter the sewers. All estimates are based upon conditions in 1950. The assumed area tributary to the sewer at that time is 52,740 acres or 82.4 square miles, and the estimated population of the district is 308,000. The area of the district in 1950 will extend as far north as the Hamilton-Butler County line and will include the principal portion of the drainage area of Mill Creek below this point. Upon this basis the maximum capacity of the intercepting sewer, flowing full, has been fixed at 193.4 cubic feet per second. No allowance is made for storm water in this basis of calculation. However, the capacity of the intercepting sewer provides 405 gallons per capita per day, which figure appears to be sufficient to allow a considerable dilution in the sewer and to insure that the first flush from the combined sewers will enter the interceptor. In general, the capacity of the proposed intercepting sewer is sufficient and even if future conditions should require a larger sewer the added capacity may be provided more economically by the construction of a second interceptor than by unreasonably increasing the size of the sewer to be installed at present.

In establishing the elevation of the proposed intercepting sewer consideration has been given to the possibility that treatment of the sewage will be ultimately required. The sewer terminates at a drop chamber west of the mouth of Mill Creek at an elevation 10 feet above pool stage of the Ohio River. From the drop chamber the flow will be carried to a submerged outlet through a 4-foot sewer. The elevation of the sewer at the drop chamber is sufficient to permit the future installation of a plant providing tank treatment and disinfection of the sewage. In this connection it should be noted that there will ultimately be constructed a system of intercepting sewers, to serve the entire city; one of which will parallel the Ohio River and probably terminate near the proposed outlet for the Mill Creek sewer. Until this comprehensive development can be accomplished it is obviously unwise to attempt development of sewage treatment.

Ohio River. The Ohio River above Cincinnati has a watershed area of 75,000 square miles, upon which there is a population estimated at 6,600,000, equivalent to 88 per square mile of watershed area. No accurate measurements of extreme low flow have been made. Records of the lowest gage height readings from 1860 to 1909, inclusive, indicate the average extreme low stage for those years to have been 4 feet. The minimum recorded gage height was 1.9 feet in 1881, and several readings less than 2.5 feet have been recorded. The volume of flow below stages of 3.9 feet is not known. A rough approximation would indicate, however, that at a stage of 2.3 feet the discharge is 5,000 second feet, which may be taken as the extreme dry weather flow. This stage has never been maintained for a period of more than a few days. The extreme minimum flow, assumed, is sufficient to furnish adequate dilution, with proper dispersion, for the sewage from a population of 1,250,000, which population will probably be reached by the Cincinnati district, including contiguous municipalities between 1950 and 2000.

Considering only the population to be served by the proposed intercepting sewer, the assumed minimum flow of the Ohio River provides a dilution of 35.7 second feet per thousand population, with 140,000 persons tributary. On the basis of the future population to be served by the interceptor, estimated at 308,000 the river will furnish a dilution of 16 second-feet per thousand when it is at extreme low stage. On the basis of the estimated maximum discharge of the proposed intercepting sewer, 193.4 second feet, the minimum flow of the river furnishes a dilution of about 26 to 1, which is theoretically sufficient to prevent a nuisance. It should be considered, also, that the maximum discharge of the interceptor will not be entirely sewage.

The above calculations would indicate that the Ohio River at extreme low stages has a flow sufficient to satisfactorily dilute the sewage to be contributed by the Mill Creek district as well as by the Cincinnati district as a whole for a number of years in the future.. It is to be expected, ultimately, some method of sewage treatment will be required to stop the increasing pollution of the stream. One hundred and twenty miles below Cincinnati the Ohio River is used as a source of water supply for the city of Louisville, Kentucky. The protection of the quality of this and other water supplies taken from the Ohio River below Cincinnati may ultimately require the treatment of the sewage of Cincinnati.

SUMMARY.

The general plans for a proposed intercepting sewer for the Mill Creek District provide a conduit of sufficient capacity to remove from Mill Creek all sewage and industrial wastes now discharged into the stream. Future extension of the district to include that portion of the drainage area of Mill Creek which will lie within the city in 1950 is provided for. Future treatment of the dry weather flow is rendered possible by establishing an elevation at the outlet end of the sewer 10 feet above pool stage of the Ohio River. The Ohio River is sufficient to receive the sewage from the proposed intercepting sewer, as well as from the entire Cincinnati district for a number of years without a resulting nuisance. Following the completion of a contemplated system of intercepting sewers for the entire city, the problem of sewage treatment will probably be considered.

ACTION OF THE BOARD.

At a meeting held September 2, 1913, the State Board of Health deferred action on the general plans, received from Victor T. Price, director of public service, August 12, 1913, for a proposed intercepting sewer for the Mill Creek District, Cincinnati, with a temporary discharge into the Ohio River.

The Secretary was instructed to advise the city authorities that the matter would be further investigated and reported upon at the next regular meeting of the Board in October.

On October 3, 1913, the chief engineer visited Cincinnati and with Mr. John W. Hill, member of the Board, conferred with Mr. H. M. Waite, city engineer, and Mr. H. S. Morse, engineer in charge of sewerage investigations. As a result of this conference the representatives of the city were advised that the engineering committee would recommend that the Board withhold approval of the general plans for the proposed Mill Creek interceptor until the plans had been examined and approved by two expert consulting sanitary engineers.

ACTION OF THE BOARD.

At a meeting held October 15, 1913, the State Board of Health received a statement of its committee, composed of Mr. John W. Hill, engineering committee of the Board, and Mr. W. H. Dittoe, chief engineer, relative to a conference held October 3, 1913, with Mr. H. M. Waite, chief engineer of the department of public service, and Mr. H. S. Morse, engineer in charge of sewerage investigations.

The Secretary was instructed to notify the city officials that the Board voted to receive the statement of the committee and to confirm the action of the committee in suggesting to the city officials that the general plans for the proposed Mill Creek interceptor be submitted to two expert consulting sanitary engineers for examination and report.

ACTION OF THE BOARD.

At a meeting held October 15, 1913, the Board approved these general plans for a proposed intercepting sewer for the Mill Creek District, Cincinnati, received from Victor T. Price, director of public service, August 12, 1913, and a report signed by three consulting engineers, containing an endorsement of the plans, submitted to the State Board of Health in compliance with the advice of its committee, given October 3, 1913, and with the action of said Board, taken October 15, 1913, subject to the following conditions:

1st. That sewage treatment works, the location and design of which shall be satisfactory to the State Board of Health, shall be installed to treat the dry weather discharge from the proposed interceptor whenever in the opinion of said Board such works shall have become necessary to prevent serious pollution of the Ohio River;

2nd. That complete detail plans and specifications for the proposed intercepting sewer shall be submitted to and shall receive the approval of the State Board of Health before contracts for the construction of the same shall have been awarded; and,

3rd. That this approval shall be void, unless the aforesaid detail plans shall have been submitted prior to June 1, 1914, and commenced prior to January 1, 1915.

In compliance with the second condition of the foregoing approval there were received, on October 23, 1913, detail plans for Contract No. 1 of the proposed intercepting sewer from Mr. V. T. Price, director of public service. These plans were referred to the engineering department and the following report was submitted:

Contract No. 1 for the proposed Mill Creek intercepting sewer comprises 3,773.23 feet of 6.25 feet by 6.25 feet semi-elliptical reinforced concrete sewer, beginning at a point about 150 feet east of Colerain Avenue and extending upstream on the westerly side of Mill Creek. This portion of the sewer will be constructed with a slope 0.001 and will have a capacity of 150 cubic feet per second. This capacity is designed for the removal from the tributary district of domestic sewage, manufacturing wastes and ground water leakage at the maximum estimated rates of flow used in the preparation of the general plans approved by the State Board of Health October 15, 1913. No connections to the proposed sewer, included in Contract No. 1, will be made until the entire Mill Creek intercepting sewer is completed. Slants for future connections from six sewers at present discharging into the stream will, however, be installed. Both ends of that portion of the intercepting sewer to be constructed will be sealed with 9-inch brick bulkheads.

As soon as the execution of Contract No. 1 is under way it is the intention to award contracts for the construction of other portions of the Mill Creek intercepting sewer.

ACTION OF THE BOARD.

At a meeting of the State Board of Health, held December 3, 1913, these detail plans were considered, but no action was taken by the Board. The authorities were so notified.

REPORT ON PROPOSED ESTABLISHMENT OF TEMPORARY SEWER OUTLET FOR PLEASANT RIDGE AND KENNEDY HEIGHTS, CINCINNATI.

On December 31, 1912, a communication was received from Mr. V. T. Price, director of public service of Cincinnati, requesting permission to eliminate the construction of sewage treatment works for Pleasant Ridge and Kennedy Heights, and to establish for temporary use an outlet into Duck Creek. On January 8 and 9, 1913, the chief engineer visited Cincinnati and made the investigation relative to the request. On January 16, 1913, the city engineer submitted a plan showing the location of the proposed temporary outlet. The following report was submitted:

Pleasant Ridge and Kennedy Heights, now portions of the city of Cincinnati, had a population of 1,770 and 660, respectively, in 1910. They are located in the extreme northeasterly part of the city on a small tributary of Duck Creek, which tributary separates the communities. In June, 1911, plans for sewerage and sewage treatment for Kennedy Heights were approved, and in August, 1911, the Board approved plans for sewerage and sewage treatment for Pleasant Ridge. In August, 1912, the Board approved of a connection of the sewerage system of Kennedy Heights with the proposed sewage treatment works of Pleasant Ridge. Shortly thereafter work was begun on the construction of the sewage treatment works, but owing to the annexation of the territory by the city of Cincinnati, the control of the construction passed from the village authorities to the city authorities. The city having in contemplation permanent sewerage improvements in the valley and on the watershed of Duck Creek, deemed it inadvisable to proceed with the construction of the Pleasant Ridge works, and interrupted the execution of the contract, pending the decision of the State Board of Health as to the immediate necessity of installing the works.

Duck Creek. Duck Creek is a small stream which rises in the easterly portion of the city of Cincinnati and is tributary to the Little Miami River at a point four miles above the junction of the latter stream with the Ohio River. The watershed area of the stream is 14.8 square miles, on which there is a population of approximately 37,000. The stream receives the surface drainage from a portion of the city of Norwood and that part of the city of Cincinnati including Madisonville, Kennedy Heights, Oakley, portions of Walnut Hills, Hyde Park and Pleasant Ridge. Duck Creek also receives large quantities of sewage from the above named districts. The principal pollution contributed by the city is from the Walnut Hills, Hyde Park, and Oakley sections, and by far the most important pollution of the stream is from the city of Norwood. The pollution reaching the stream from Norwood, as well as from portions of Walnut Hills and Hyde Park, is discharged at distances of one mile or more above the proposed point of outlet for Pleasant Ridge and Kennedy Heights, and during extreme low flow of the stream its degree of pollution above the proposed point of outlet is excessive.

The minimum dry weather flow in Duck Creek has not been accurately determined by measurements, although a series of rough measurements in 1912 gave an average of 3,000,000 gallons per 24 hours, or approximately 4.5 cubic feet per second. Judging from the area and character of the watershed, the minimum discharge at the mouth of the stream probably does not exceed 1.5 second feet. Above the proposed point of outlet Duck Creek has a watershed area of only 6 square miles, and as has been stated, receives sufficient sewage to be seriously polluted. Its minimum flow at this point probably does not exceed 1 cubic foot per second. At the proposed point of outlet the stream at minimum stage offers no opportunity for disposal of sewage by dilution. Below the proposed point of outlet the stream flows in a general southerly course, passing through sparsely populated territory, a distance of 4.5 miles to the Little Miami River. Madisonville, located immediately east of the stream and about one mile below the proposed outlet, is at the present time unsewered, although plans are in progress for a complete system of combined sewers for this community. In connection with the sewering of Madisonville, the construction of an interceptor following the valley of Duck Creek will be undertaken, at which time the proposed outlet for Pleasant Ridge and Kennedy Heights may be eliminated. Inasmuch as the sewer system for Pleasant Ridge and Kennedy Heights are both constructed on the separate plan, it will be unnecessary to maintain an outlet into Duck Creek after the intercepting sewer has been installed.

The location of the proposed temporary outlet is at the confluence of Duck Creek with the small tributary flowing between Pleasant Ridge and Kennedy Heights. This point is near Madisonville Road, a much traveled highway, and the nuisance which will be caused will give rise to complaint. The temporary outlet should be located farther down stream at least 500 feet below Madisonville Road.

The plan submitted January 16, 1912, showing the proposed location of the temporary outlet indicates the general course of the contemplated Duck Creek intercepting sewer. Its upper end will be at the head waters of the stream and either an outlet into the Little Miami River or sewage treatment works will be provided. The question of disposal of the sewage from the intercepting sewer district will be a matter for later consideration.

Advisability of Installing Sewage Treatment Works for Pleasant Ridge and Kennedy Heights. It is estimated that the total cost of sewage treatment works for these communities will be $25,000. It is expected by the officials of the city of Cincinnati that the construction of an intercepting sewer in the valley of Duck Creek will be under way in the spring of 1914, and will be completed within one year, at which time it will be advisable both for economical and sanitary reasons to abandon the Pleasant Ridge plant, should this be constructed, and connect with the intercepting sewer. If construction work on the Pleasant Ridge plant is begun as soon as the weather will permit it may be completed and placed in operation by July, 1913. The plant could be used advantageously, therefore, only during the period from the fall of 1913 until the spring of 1915, when the interceptor will have been completed, if the plans of the city of Cincinnati are carried out.

Regarding the proposed location of the Pleasant Ridge plant, it is satisfactory if care is taken in its maintenance. If the plant is neglected, however, and odors should be created it will become a nuisance to several residents nearby. It would, therefore, seem apparent that the sewage would be more properly disposed of through an intercepting sewer than through sewage treatment works, and with this in view it would seem desirable to encourage the construction of an intercepting sewer rather than to interfere with its construction by insisting upon the installation of the Pleasant Ridge sewage treatment works.

ACTION OF THE BOARD.

At a meeting held January 22, 1913, the State Board of Health considered the request of Mr. V. T. Price, Director of Public Service, Cincinnati, under date of December 31, 1912, for permission to omit the construction of the proposed sewage treatment works for Pleasant Ridge and Kennedy Heights and to establish a temporary outlet into Duck Creek.

The Board voted to grant this permission subject to the following conditions:

1st. That the temporary outlet be located downstream from the proposed location at least 500 feet below Madisonville Road;

2nd. That plans satisfactory to the State Board of Health providing for an intercepting sewer following Duck Creek, and for proper disposal of the sewage be prepared and submitted to the State Board of Health;

3rd. That this approval shall be void unless the said plans shall have been submitted prior to October 1, 1913; and,

4th. If the discharge of sewage from the proposed temporary outlet should cause a decided nuisance in Duck Creek, the city of Cincinnati shall immediately remedy this in a manner satisfactory to the State Board of Health without regard to the time when plans for the proposed intercepting sewer are to be submitted.

REPORT ON PROPOSED INTERCEPTING SEWER FOR THE WESTWOOD DISTRICT, CINCINNATI.

On February 25, 1913, plans were received from Mr. V. T. Price, director of public service, Cincinnati, for a proposed intercepting sewer for the Westwood district of that city. The plans were referred to the engineering department and on March 13th the chief engineer visited Cincinnati and investigated the proposed improvement. The following report was submitted:

The Westwood district is located on elevated ground in the extreme westerly portion of the city of Cincinnati. In 1910 the population of the district was 3,640, and the population of Cheviot, an adjoining village, was 1,930. An area of 990 acres with a population of 2,000 in the Westwood district, and the village of Cheviot, with an area of 445 acres, are upon the drainage area of Muddy Creek, a small stream which enters the Ohio River about seven miles southwest of Westwood. In 1910 and 1911 the city of Cincinnati installed a system of combined sewers for the Westwood district without having obtained an approval of the plans by the State Board of Health. The main outfall sewer, 9 feet in diameter, discharges into one of the headwater tributaries, Muddy Creek, in the extreme southwesterly portion of the village. Above the discharge the sewer intercepts all surface drainage and forms a conduit for the stream itself.

During dry weather when the runoff is small the sewage discharged at the outlet creates a nuisance which has been complained of to the State Board of Health. As a result of the complaints received, the State Board of Health at a meeting held October 23, 1912, voted to require the city of Cincinnati to improve conditions either by the construction of a system of sanitary sewers for the district and a sewage purification plant, or by the construction of a sewage purification plant to treat the dry weather flow from the existing sewers. The advice of the board gave preference to the use of sanitary sewers.

Subsequent to the receipt of this order from the State Board of Health, the city immediately proceeded to devise a suitable means of abating the objectionable conditions. Various projects were considered including (1) the construction of sanitary sewers with a treatment plant, (2) the construction of an intercepting sewer to divert the dry weather flow to a treatment plant down stream, (3) the construction of an intercepting sewer downstream to the Ohio River, and, (4) the construction of an intercepting sewer leading through a tunnel to the Lick Run sewer on the Mill Creek watershed. After a thorough study upon the part of the city engineering department it was deemed advisable to adopt the last mentioned plan by diverting the dry weather flow to the Lick Run sewer.

PROPOSED INTERCEPTING SEWER.

The plans of the city engineering department provide for the construction of an intercepting sewer to divert the dry weather flow and a portion of the storm flow from the existing outlet to the Lick Run sewer. The proposed interceptor will be 27 inches in diameter and constructed with a constant grade of 0.38 per cent. Through a portion of its course the sewer will be placed in a tunnel, as its invert will be at a maximum of 130 feet below the surface of the ground. With a maximum cut of 30 feet the length of the tunnel will be 4,800 feet.

The proposed interceptor is designed to serve an ultimate population of 21,500 (15 persons per acre on 1,435 acres), which is estimated to be the tributary population in 1950 in the Westwood district and in Cheviot. The capacity requirement used in the design is 300 gallons per capita, equivalent to 6.4 million gallons per day or 10 cubic feet per second.

The 27-inch interceptor shown on the plans has a capacity of 10.4 million gallons per day or 16 second feet, which is 60 per cent in excess of that required by the estimated ultimate population. This will provide for the dilution of 8 to 1 with a per capita sewage flow of 60 gallons and a population tributary of 21,500.

The proposed interceptor in diverting the dry weather flow will also receive the dry weather flow of Muddy Creek from its drainage area, 990 acres, above the point of interception. Inasmuch as the flow of the creek is now contained within the 9-foot outfall sewer which also receives the dry weather sewage flow, it is impossible to separate these flows and maintain the natural flow of the creek. It should be noted that by the construction of the proposed intercepting sewer no flow will occur in the stream below the existing outlet until the capacity of the interceptor, 16 cubic feet per second, is exceeded by the flow in the outfall sewer. This dilution of the flow may bring about complaints by riparian owners.

From the standpoint of abating an existing nuisance in Muddy Creek the proposed interceptor will be satisfactory. The discharge of diluted sewage during storm flows is not likely to cause a nuisance in Muddy Creek as at such times the dilution will always be in excess of 8 to 1 at the outlet, and the dilution will increase with the volume of discharge. Additional dilution will be afforded by tributaries entering the stream a short distance below. The disposal of dry weather flow by discharge into the Lick Run sewer will transfer the pollution to Mill Creek. However, as is well known Mill Creek is already seriously polluted and the city is now making preliminary surveys to construct an intercepting sewer following the valley of the creek and removing all offensive wastes now discharged into the stream. The solution of the Lick Run sewer problem will, therefore, be a portion of this plan.

ACTION OF THE BOARD.

At a meeting held May 22, 1913, the State Board of Health considered this report and voted to withhold approval of the plans for a proposed interecepting sewer for the Westwood District, Cincinnati, submitted by Mr. V. T. Price, director of public service, February 25, 1913.

The city officials were advised as follows:

"1. That it is the opinion of the State Board of Health,

a. The scheme of diverting the dry weather flow from the Westwood District to the Lick Run sewer by means of a tunnel is not feasible; and,

b. A more satisfactory and permannet solution of the problem of the pollution of Muddy Creek will be secured by extending an intercepting sewer from the existing outlet down stream to a suitable point of outlet, or to a suitable site for treatment works.

2. That the Board will require the submission of definite plans and cost estimates in accordance with the foregoing advice within ninety days, or by August 22, 1913."

June 28, 1913, the director of public service of Cincinnati, asked the Board to reconsider this action, claiming that definite plans had been submitted which were not only feasible, but economical, as the city desired to proceed with the construction work that would be required to provide suitable disposal of the Westwood Sewerage District.

At its meeting held July 23, 1913, the Board voted to not rescind its former action.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT PLANT FOR THE ANDREW SCHELL SUBDIVISION NO. 2, CLEVELAND.

On August 28, 1913, plans were received from Mr. F. B. Krause, engineer for The Andrew Schell Subdivision No. 2. The plans showed a proposed sewerage system including a sewage treatment plant. On September 12, 1913, a letter was submitted by Mr. Krause and signed by the chief engineer of the city of Cleveland, which gave the city's approval of the proposed project. On October 6 and 8, 1913, revised plans were submitted. An inspection of the site upon which it is proposed to construct the sewage treatment plant was made on September 25, 1913. After a review of the plans submitted on October 6 and 8, 1913, the following report was prepared and is herewith submitted:

The Andrew Schell Subdivision No. 2, is located in the extreme southwestern portion of the city of Cleveland. It is immediately west from West 21st Street, and includes a portion of Saratoga Avenue and Cypress Avenue. On Saratoga Avenue there are 58 lots, while on Cypress Avenue there are but 11, making a total of 69 available building sites. To the south of the subdivision is located the Newburg Heights Cemetery. That portion of the city to the west is quite thickly populated, but that portion to the east, which is included in Newburg Heights, is still used for truck gardening. At the present time there exist but three houses on the subdivision with a total population of 15. It is estimated that by 1915 there will be a population of 100.

The owners of the subdivision are desirous of securing both water and sewer facilities for the allotment. The city water works department will not place water mains upon any street which is not provided with sewers and as it is practically impossible for the city to install sewers in this locality at the present time it becomes necessary for the owners to provide such conveniences. They propose, therefore, to install the sewers in accordance with the sewer specifications of the city and to include in their installation a temporary sewage treatment plant. In conversation with the chief engineer of the city he stated that the city would provide an outlet for the sewage of this district within the next two or three years. This being the case the plant to be installed is for temporary use only.

PROPOSED SEWERAGE.

The sewers to be constructed on the streets range from 12 to 15 inches in diameter with a temporary sewer 8 inches in diameter leading from Saratoga Avenue to the site of the sewage treatment works. The sewers are for sanitary purposes only and will have a total length of 1,650 feet.

PROPOSED SEWAGE TREATMENT PLANT.

The temporary sewage treatment plant which is to be installed will consist of a two-story sedimentation tank, a dosing tank, two intermittent sand filters, and a sludge bed.

Site. The site selected is on ground which is slightly lower than the surrounding territory and through which passes an intermittent stream, with but a small watershed area. The land reserved has an area of one acre, and is located upon the subdivision and includes the most easterly lots of the subdivision, located on the south side of Saratoga Avenue and lying between that avenue and the Newburg Heights Cemetery. The nearest habitation to the proposed site is 180 feet with about 400 houses within a radius of 1,500 feet, practically all of which are to the north and west. If the plant is properly constructed and properly operated there should be little inconvenience due to odors. Since the prevailing winds are from the southwest what odor is created will be carried away from the populated district.

Sedimentation Tank. A two-story sedimentation tank 6 feet in diameter and 20 feet deep is to be provided. The tank is to be constructed of brick and will be divided into sludge and settling compartments. The settling compartment which has the form of an annular ring surrounds the central quiescent portion. The capacity of the settling compartment is 104 cubic feet or 780 gallons. The distance of flow of the sewage from the inlet to the outlet is 16 feet. The flow of the sewage is regulated by means of three baffles, the first is placed within one foot of the inlet, the second nine feet from the inlet, and the third immediately in front of the outlet. The elevation of the inlet and outlet is the same. With the ultimate capacity of the plant of 6,000 gallons per 24 hours the period of retention in the settling compartment is 3.1 hours.

The sludge compartment is 10 feet deep and has a capacity of 218 cubic feet or 1,635 gallons. Taking the ultimate population as 100 the sludge compartment provides or the storing of 415 days' accumulation of sludge. The sludge will be removed from the tank by means of a

4-inch cast iron sludge pipe. The head available is 2.75 feet, this is small but provision has been made for increasing the head to 5.75 feet. This may be done by placing the gate or stop plank at the outlet thereby backing the sewage into the sewer. Water connections are provided in order that the sludge may be loosened should it become compacted. The tank is to be provided with a wooden cover.

Sludge Bed. A sludge bed divided into three units is to be included in the installation. Each unit is 7 by 12 feet in plan with an area of 84 square feet. A total area of 252 square feet is, therefore, provided by the three units. This area is excessive in that it provides 2.5 square feet per person. The 4-inch sludge pipe leading from the tanks will discharge upon the surface of the beds. A 6-inch main underdrain with two 4-inch laterals is provided for each unit. The bottom of the beds will be sloped to the lateral drains which are to be constructed of farm tile. The filtering medium is to be gravel with a thickness of 15 inches. As the sludge dries it will be removed to farm land and buried. The beds are to be provided with covers.

Dosing Chamber. The main portion of the dosing chamber is 10 feet by 10 feet in plan with an average depth of 1.45 feet. An L extends from the main portion of the tank. The L is 2 by 3 feet in plan and has an average depth of 1.3 feet. The entire dosing chamber has a capacity of 152 cubic feet. It is to be constructed of concrete and cypress with a wooden cover. A single siphon is provided. The head under which the siphon acts is 1.6 feet.

Intermittent Filters. Two intermittent sand filters each 30 by 14 feet in plan are shown. The total area provided will, therefore, be 840 square feet. This area provides, when the sewage flow is 6,000 gallons per day, a rate of filtration of 300,000 gallons per acre per day. This rate is high but it will probably be several years before it will be realized, and is sufficient to care for the sewage flow until such a time as the city sewers are installed. The filtering material will consist of 2 feet 4 inches of sand ranging from 1/8 to 1/2 inch in diameter and the lower layer of stone ranging from 1/2 to 1 1/2 inches in diameter. The size of the sand is large and a finer grade should be included. The sewage coming from the dosing chamber will be diverted by means of stop planks onto either of the two beds. Two wooden distributors are provided for each unit. The drainage system consists of a 6-inch main underdrain with 4-inch laterals placed three feet on centers. At the outer end of each lateral a 4-inch ventilator will rise to an elevation of one foot above the surface of the sand. The effluent drains are to be bedded in cinders. The elevation of the flow line in the tank is 172.5, that of the surface of the filter 170.5, and the invert of the outlet sewer 167.25. The effluent from the plant will discharge into a 24-inch sewer through which the surface water passes. This sewer is 540 feet in length. At the end of the 24-inch line an overflow is provided, and a

12-inch line 780 feet in length extends to the eastward from West 21st Street, and discharges into a natural watercourse which is tributary to the Cuyahoga River. Both the 24-inch and the 12-inch sewers are already installed.

SUMMARY.

In order to provide both water and sewerage facilities for the Andrew Schell Subdivision No. 2, the owners propose to install both sewers and a temporary sewage treatment plant. When such an installation has been made the city of Cleveland will install water. The subdivision is located in the southwestern portion of the city and is not provided with the best of sites for sewage treatment works. It is possible, however, that a temporary plant may be installed and that with proper care no nuisance will be created. The plant will consist of a two-story settling tank, a sludge bed which is excessively large, a dosing chamber, and two intermittent sand filters. The sand filters are small when the ultimate sewage flow expected is considered. The sand to be provided is coarse and finer material should be used. It is possible that additional units may be added as they are needed. The chief engineer of the city of Cleveland stated that sewers would be installed in this district within the next two or three years.

ACTION OF THE BOARD.

At a meeting held October 15, 1913, the State Board of Health considered the plans for proposed sewerage and a sewage treatment plant for the The Andrew Schell Subdivision No. 2, Cleveland, received from Mr. F. B. Krause, civil engineer, October 6th and 8th, 1913, and these plans were approved subject to the following conditions:

1st. That sand having an effective size of 0.4 to 0.6 m. m. and a uniformity coefficient of not more than 2.0 shall be used as a filtering medium in the intermittent and sludge filters; and that samples of the sand to be used shall be approved by the engineer of the State Board of Health before being placed;

2nd. That the owners of the proposed sewage treatment plant shall employ a caretaker to visit the plant at least twice each week and attend to its proper operation;

3rd. That the entire plant shall be abandoned and removed as soon as sanitary sewers for the district shall have been constructed by the city of Cleveland;

4th. That the plant shall be enlarged in a manner satisfactory to the State Board of Health when deemed necessary by said Board; and,

5th. That this approval shall be considered void unless the proposed sewerage and sewage treatment plant shall have been constructed prior to June 1, 1914.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT PLANT FOR RENKER AVENUE, S. W., CLEVELAND.

On June 16 and 28, 1913, plans for proposed sewerage and sewage treatment plant for Renker Avenue, S. W., Cleveland, were received from The Wm. H. Evers Engineering Company, consulting engineers for the owners of the property abutting Renker Avenue. On June 26, 1913, one of the assistant engineers visited Cleveland and investigated the proposed improvements. The following report was submitted:

Renker Avenue, S. W., is a recently opened street 1,500 feet in length, located in the extreme southerly portion of the city of Cleveland, a short distance southwest of the confluence of Big Creek with the Cuyahoga River. The surrounding area has been recently annexed to the city and has not been provided with sewerage facilities. Plans and specifications for sewers for the district have been approved by the city council, but it is not likely that these sewers will be constructed within three years. In order to provide adequate drainage and sewerage it is necessary that the sewers be constructed at private expense.

At the present time there are only three dwellings constructed or in process of construction on Renker Avenue, but it is expected that within one year the population on the street will be 50. In 1915 it is estimated that the population will be 100. The ultimate population when all of the properties shall have been occupied will be 250.

Proposed Sewerage. The proposed sewer will have a length of 1,400 feet and will be constructed of 12-inch and 15-inch vitrified pipe. It will be used as a combined sewer and will be built according to standard specifications of the city of Cleveland. At its lower end will be placed a diverting manhole from which the dry weather flow will be intercepted above a low dam and conveyed to a sewage treatment plant.

Proposed Sewage Treatment Plant. The sewage treatment plant is designed for a population of 125, contributing a sewage flow of 6,250 gallons. The design includes a settling tank; sludge filter; dosing chamber; and intermittent sand filters. The entire plant will be covered to avoid the dissemination of odors. Its location is satisfactory provided the plant be given sufficient care to avoid its deterioration and the consequent production of a nuisance.

The settling tank will be 9 by 4 feet in plan and 5.75 feet in average depth to the flow line and will have a capacity of 1,550 gallons, sufficient to provide a retention period of six hours when the sewage flow is at a rate of 6,250 gallons per day. At the outlet end of the tank the sewage will pass upward through a bar screen which will prevent the passage of heavy suspended matter through the tank. The sludge filter is 10 by 15 feet in plan and 150 square feet in area, which is sufficient to receive the contents of the settling tank with a flooded depth of 16 inches. Two feet of sand underlaid with crushed stone will serve as the filtering material.

The dosing chamber which adjoins the settling tank, has a capacity of 420 gallons, sufficient to flood the intermittent filters to a depth of 1.8 inches. A 3-inch automatic siphon will provide for discharge to the filters. Sequence of operation of the filters must be secured by hand operation of gates. Two units of intermittent sand filters will receive the dosing tank discharge and provide for the final treatment of the sewage. The units have a total area of 756 square feet, which is sufficient to properly treat 1,750 gallons per day, equivalent to the sewage from 35 persons. As the sewage flow increases beyond this figure enlarged filter area will be required. The filters are constructed with 30 inches of sand resting upon an underdrainage system of coarse stone.

The effluent from the plant will discharge into a small tributary of Big Creek which enters that stream about 2,500 feet north of the outlet at a point 3,000 feet above its confluence with the Cuyahoga River.

SUMMARY.

The proposed sewer for Renker Avenue, S. W., will provide a necessary sanitary improvement and the proposed treatment plant will serve temporarily to avoid the production of a nuisance pending the construction of sewerage for the district by the city of Cleveland. The plant will satisfactorily serve 35 persons and may readily be enlarged to serve 250. Provision should be made for such enlargement in case the construction of city sewers is delayed.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, the plans for proposed sewerage and sewage treatment plant for Renker Avenue, S. W., Cleveland, received from The Wm. H. Evers Engineering Company, June 16th and 28th, 1913, were approved subject to the following conditions:

1st. That samples of filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

2nd. That the owners of the sewer and sewage treatment plant shall employ a caretaker to visit the plant at least twice each week to attend to its proper operation;

3rd. That the entire plant shall be abandoned and removed as soon as sanitary sewers for the district shall have been constructed by the city of Cleveland;

4th. That the filter area shall be enlarged in a manner satisfactory to the State Board of Health when the population tributary shall have exceeded fifty; and, 5th. That this approval shall be considered void unless the proposed sewer and sewage treatment plant shall have been constructed prior to June 1, 1914.

REPORT ON PROPOSED PRIVATE SEWER AND SEWAGE TREATMENT PLANT IN CLINTON TOWNSHIP, NEAR COLUMBUS.

On June 13, 1913, a plan for a proposed private sewer and sewage treatment plant to be constructed by Mrs. E. H. Kauffman in Clinton Township, near Columbus, was submitted by Mr. R. K. Schlafly, designing engineer. The plans were referred to the engineering department and the following report was submitted:

The proposed sewer is to extend from High Street to Olentangy River along Mill Road in Clinton Township, two miles above the northerly corporation limits of Columbus. The total length of the sewer will be 2,400 to 3,600 feet, depending upon the location of the outlet, and it will be constructed of 8-inch vitrified sewer pipe. Drainage will be provided for six residences, the ultimate population of which will be 30. It is proposed to utilize the sewer for cellar drainage, sink wastes, and domestic sewage. Throughout its course the sewer is constructed with a good grade which will insure self-cleansing velocities.

The water supplies are obtained from private wells and storage for the operation of modern plumbing conveniences will be secured by individual tanks in the various dwellings. It is estimated that the ultimate sewage flow will be 1,800 gallons per 24 hours occurring during 18 hours. The average will, therefore, be 100 gallons per hour.

Three alternate outlets located within 1,200 feet south of Mill Road have been selected. The decision as to the outlet to be used will depend upon the acquirement of a right of way. Before discharging the sewage into the Olentangy River it is proposed to clarify it by-passing it through a settling tank of the two-story type. The design provides for a tank of brick construction 3 feet by 6 feet in plan and 6 feet deep below the flow line. The tank will be placed entirely underground, the top being two feet below the surface and will be ventilated by two 6-inch pipes extending above the surface. Separate sedimentation and sludge compartments are provided to insure good settling action. The sedimentation compartment which will be of wooden construction has a capacity of 250 gallons, which provides a period of retention of 2.5 hours, and the sludge compartment has a capacity of 30 cubic feet which will provide a period of retention of sludge from 30 persons of 200 days. A 4-inch sludge pipe leads from the bottom of the tank to the Olentangy River through which it is proposed to discharge the sludge during high stages of the stream, disposing of the same by dilution.

The Olentangy River above the point of outlet has a watershed area of approximately 500 square miles and the minimum dry weather flow is estimated at 15 second feet. During low stages the flow is sufficient to receive the tank effluent and during high stages the discharge of the stream is amply able to receive the sludge without visible effect.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the plans submitted June 13, 1913, by Mr. R. K. Schlafly, designing engineer, for a proposed private sewer and sewage treatment plant to be constructed by Mrs. E. H. Kauffman in Clinton Township, near Columbus, were approved subject to the following conditions:

1st. That the population connected to the proposed sewer shall not exceed 30;

2nd. That no sludge shall be discharged from the tank except during high stages of the Olentangy River; and,

3rd. That this approval shall be void unless the proposed sewer and sewage treatment plant shall have been installed prior to October 1, 1913.

REPORT ON REVISED PLANS FOR PROPOSED SEWERAGE AND SEWAGE TREATMENT PLANT FOR COLUMBIANA.

On August 12, 1913, revised plans for proposed sewerage and sewage treatment plant for Columbiana were received from Mr. E. G. Bradbury, consulting engineer for the village. On August 14, 1913, the Chief Engineer visited Columbiana and investigated the proposed improvements. After an examination of the plans the following report was submitted:

Columbiana, a village with a population of about 1,600, is located in Columbiana County on the easterly side of Mill Creek, which is tributary to the Mahoning River at Youngstown. The village covers an area of about one square mile and is situated on a knoll, the highest portion of which is at the central portion of the village. Surface drainage is in practically every direction from this point. The village has a public water supply obtained from drilled wells in the southwesterly portion of the corporation. The quality of the water obtained from this source is good and the supply is generally used for domestic purposes. At the present time there are no sewers in the village and in the absence of proper sewerage, insanitary conditions exist. Bonds have been sold for the installation of a complete system of sanitary sewers and sewage treatment works and it is proposed to install these improvements during the present year.

PROPOSED SEWERAGE.

The plans for the sewerage system provide for the installation of approximately 9.8 miles of sanitary sewers, which will cover practically the entire area of the village. The collection of the entire sewage flow at one point for disposal is accomplished by a trunk sewer, encircling the southerly portion of the village and terminating in the valley of Mill Creek in the northwesterly portion of the village. The sewers will be constructed of vitrified pipe, ranging in size from 6 inches to 15 inches in diameter. Only 280 feet of sewers are to be constructed of 6-inch pipe and the major portion of the system or 8.3 miles will be of 8-inch pipe. To prevent infiltration of ground water the joints will be sealed with a special watertight compound. Manholes will be provided at intersections and changes of grade and direction and in general it may be stated that the design of the sewerage system is in accordance with good engineering practice. Inasmuch as the line of sewer passes in close proximity to the water supply wells, it would be advisable to prevent any possible pollution of the supply by securing perfectly watertight joints at this point, and by replacing the existing vitrified pipe gravity conduit from the wells by cast iron pipe.

PROPOSED SEWAGE TREATMENT PLANT.

The plans of the consulting engineer provide for the installation of a sewage treatment plant to serve a population of 2,000, or a sewage flow of 100,000 gallons per 24 hours. The main features of the plant comprise a sedimentation tank and sludge filter, a dosing chamber, and intermittent filters.

Site. The village has purchased a tract, 6.2 acres in area, bordering Mill Creek, and located partly within the corporate limits of the village. The major portion of the city is northwest of the village and the westerly boundary is formed by Mill Creek. The topography is favorable for the installation of a treatment plant, to receive the sewage by gravity and operate without pumping. Its elevation is sufficient to avoid flooding during high stages of the stream. The plant will be located on the site so that the settling tank will be 900 feet and the filters 1,200 feet from the nearest dwelling. Within a radius of 1,000 feet from the proposed site there are about nine dwellings, all of which are in a general southwesterly direction. Future development in the vicinity of the plant will probably be slight, owing to the more favorable topographic conditions of other outlying sections. As a whole it may be said that the proposed site is satisfactory.

Sedimentation Tank. The 15-inch trunk sewer discharges into a screen chamber 4 by 4 feet in plan and 3 feet deep. A cover should be provided for this device. From the screen chamber the sewage passes into a covered sedimentation tank. This tank is of the two-story type, having sedimentation and sludge compartments, separated by a false bottom. The tank is circular in plan, 19 feet in diameter, and 25 feet 5 inches in depth from the flow line to the bottom of the sludge well. The sedimentation compartment has a capacity of 18,500 gallons, which with complete displacement will provide a retention period of 4.4 hours, based on the nominal capacity of the plant. The sludge compartment has a capacity of 1,700 cubic feet which will supply sludge storage for 160 days, with a population tributary of 2,000. An 8-inch cast iron pipe leads from the bottom of the sludge well to a sludge filter and provides for the removal of sludge at a static head of four feet.

Sludge Filters. The sludge filter is 20.5 feet square and has an area of 420 square feet. Upon the basis of commonly accepted standards this area is sufficient to serve a population of 1,260. The filtering material will comprise 15 inches of sand underlaid by a single 4-inch line.

Dosing Chamber. The effluent from the sedimentation tank enters a dosing chamber from which it is intermittently discharged to the filters. The chamber is a covered, rectangular, reinforced concrete structure, 18 by 25 feet in plan and 3 feet in depth to the flow line. The capacity of the chamber is, therefore, 10,000 gallons, which is sufficient to flood a filter unit to a depth of 1.8 inches. Two 8-inch alternating siphons are provided for the automatic discharge of the contents of the chamber.

Intermittent Filters. The discharges from the dosing chamber enter two gate chambers, each of which controls the operation of three intermittent filters. Shear gates may be set to throw any unit in or out of service. The six units, with an area of 9,000 square feet each, are arranged in a hexagon, the total area provided being 1.24 acres. Earth embankments will be utilized to surround and separate the units. The filtering material will comprise a layer of coke breeze or sand, 30 inches in thickness. The sewage will be applied through a distribution trough, discharging at the center of each unit and the effluent will be collected through a system of underdrains, varying in size from 4 inches to 8 inches in diameter.

The area of the filters provides for a rate of operation of 80,000 gallons per acre per 24 hours, based on the nominal capacity of the plant, and with a population tributary of 2,000 the load will be 1,600 per acre. Satisfactory results will be obtained under these conditions.

Disposal of Effluent. The effluent from the filters discharges into Mill Creek near the plant. The stream at this point is small, having a watershed area of only 4.3 square miles. The minimum dry weather flow is practically nil and is not sufficient to be considered as a factor in preventing the production of a nuisance. Efficient operation of the sewage treatment plant must be accomplished at all times. Below Columbiana, Mill Creek follows a general northerly direction, entering the Mahoning River at Youngstown, 15 miles north of Columbiana. The stream is not used as a public water supply although it has been considered as a source of supply for the city of Youngstown.

ACTION OF THE BOARD.

At a meeting held September 2, 1913, the State Board of Health approved the plans for proposed sewerage and sewage treatment for Columbiana, received from Mr. E. G. Bradbury, consulting engineer, August 12, 1913, subject to the following conditions:

1st. That a competent person shall be engaged to superintend the maintenance of the sewerage system and sewage treatment works;

2nd. That the village council shall pass an ordinance satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary sewers and enforcing connections to the proposed sewers to secure the abandonment of existing cesspools and privy vaults;

3rd. That the proposed filtering material shall be approved by the engineer of the State Board of Health before the same is placed; and,

4th. That this approval shall be void after January 1, 1915, unless the proposed sewage treatment plant and sewerage system shall have been constructed prior to that date.

REPORT ON OPERATION OF SEWAGE PUMPING STATIONS AND SEWAGE TREATMENT WORKS AT COLUMBUS.

On July 2, 1913, the chief engineer accompanied by the chemist in charge of the sewage treatment plant at Columbus, made an examination of the main sewage pumping station, sewage treatment works, and Scioto River below the works. On July 14, 1913, the chief engineer examined Alum Creek at and below the storm water overflow of the east side sewerage district. Records of operation of the main and east side pumping stations were obtained from the department of public service and analytical data of examination of the Scioto River were furnished by the chemist in charge of the Columbus sewage treatment plant. Based on the above mentioned investigations and data, the following report was prepared:

In 1908 the city of Columbus completed extensive sewerage improvements, the main features of which included sewage treatment works, a main pumping station, and an east side pumping station. The total cost of the work, including an experimental investigation, was $1,351,000. The experimental studies indicated that a plant comprising settling tanks, sprinkling filters and secondary sedimentation basins would satisfactorily prevent the pollution of the Scioto River and a plant of this type with a capacity of 20,000,000 gallons of sewage per day was installed. At the time of the installation of the plant the dry weather flow was about 15 million gallons per 24 hours, but since that time the flow has increased until present average daily sewage flow is approximately 20,000,000 gallons per day.

The east side pumping station is provided to lift the dry weather flow from a large district formerly tributary to Alum Creek and discharges the sewage into the sewerage system tributary to the main intercepting sewer extending along the Scioto River. A 9-foot storm water overflow discharges into Alum Creek a short distance south of Main Street near the east side pumping station. This overflow comes into service when the pumps are idle and when the sewage flow is increased as a result of rainfall. The rated capacity of the pumping equipment is 4.4 million gallons per 24 hours when both units are operated, while the rated capacity of a unit operated singly is 2.9 million gallons.

The main pumping station, located at the lower end of the main intercepting sewer, has a total capacity to pump 41 million gallons per 24 hours. Three 11 million-gallon units and two 4 million-gallon units are provided. The sewage treatment works, as previously stated, has a nominal capacity of 20 million gallons per 24 hours.

Operation of Pumping Station. During the year 1913 the east side pumping station was not operated until April 30th. Since that date the station has been operated each day. However, for some unknown reason only one unit is used at a time and numerous interruptions in operation have occurred. An appended table gives the pumping records for June, 1913. It should be noted that the operation of the pumps was irregular and that the overflow into Alum Creek must have come into service quite frequently. There appears to be no reason why all of the dry weather flow of sewage should not be pumped. With the present equipment the theoretical capacity is 4.4 million gallons per 24 hours, which is in excess of the dry weather flow. If this capacity cannot be realized with the present equipment new equipment should be provided.

The main sewage pumping station was not operated during 1913 until May 17th. It has been in operation each day since that time. The pumping station records, however, show that a considerable portion of the sewage reaching the station is allowed to flow to the Scioto River and is not pumped to the treatment plant. An appended table contains the records of pumping for June, 1913. It will be noted that the maximum pumped was approximately 20 million gallons and the average 15.7 million gallons. The minimum quantity was about 9.8 million gallons, this volume being pumped seven days during the month. The records of operation of the individual pumps indicate a practice of operating a single 11 million-gallon unit during a greater portion of the time. With two 11 million-gallon units and two 4 million-gallon units in reserve this seems entirely unnecessary.

Operation of Sewage Treatment Works. At the sewage treatment works all of the sewage discharged from the pumping station has been treated. It is, therefore, operated at rates varying with the pumping. There is little doubt that the plant has reached its capacity, assuming that all of the sewage is discharged to it. On the day of the examination when the plant was treating sewage at the rate of approximately 20 million gallons per day, the effluent had little odor but was highly discolored and affected the appearance of the Scioto River.

Pollution of Scioto River. The effect of by-passing crude sewage into the Scioto River at the main pumping station results in a serious pollution of the river during low stream flow. On the day of the examination the stream was noticeably polluted above the outlet from the sewage treatment plant. It contained sludge in large amounts and was in a septic condition. The stream was examined at distances 4 miles, 7 miles, 9 miles and 11.3 miles below the discharge of the effluent from the sewage treatment plant. At a point 4 miles below the outlet the stream was black and septic. Odors were apparent from the west side of the stream with a westerly wind. At Shadesville, 7 miles below the outlet, the stream was slightly improved but still noticeably discolored and septic. At the confluence of the Scioto River with Big Walnut Creek 9 miles below the outlet, the river had a more pleasing appearance, resulting from aeration secured below Shadesville. It had, however, considerable floating scum and sludge. The diffusion of the waters of the river and creek resulted in a clearing of the stream and at a point 11.3 miles below the outlet the stream had returned to its normal condition.

POLLUTION OF ALUM CREEK.

At the outlet of the storm water overflow Alum Creek was noticeably polluted by sewage which had been discharged prior to the examination. No flow from the overflow sewer could be detected at the time of the inspection. The creek was filled with foul sludge deposits in an active state of putrefaction, which gave rise to unsightly conditions and foul odors. The condition of Alum Creek has not been seriously complained of during the present year, although during the summer of 1912 several complaints were made to the State Board of Health.

SUMMARY.

The foregoing report indicates that although the city of Columbus in 1908, at an expenditure of $1,351,000, provided equipment thought to be suitable at that time for preventing the pollution of the Scioto River and Alum Creek, there has resulted a noticeable pollution of both streams as shown by the investigations made July 2 and 14, 1913. It appears that the cause of this pollution is the discharge of untreated sewage into the streams, resulting from failure to operate the pumping stations provided to deliver the sewage to the treatment works. With the entire volume of sewage delivered to the works it is probable that the capacity of the various devices will be overtaxed and that extensions and improvements to prevent pollution of the Scioto River during low flow will be necessary.

RECORD OF PUMPAGE FOR THE MAIN SEWAGE PUMPING STATION, COLUMBUS, OHIO.

June, 1913.

Date.	Pump. Hours.	Theoretical Pumpage (Million Gallons.)	Actual Pumpage (Million Gallons.)	Rainfall.
1	35	16.04	14.27	0.39
2	36	16.50	14.68	0.0
3	41	18.79	16.70	0.16
4	39	17.87	15.90	0.0
5	48	22.00	19.65	0.0
6	47	21.54	19.15	T
7	36	16.50	14.68	0.0
8	24	11.00	9.82	0.0
9	24	11.00	9.83	0.0
10	24	11.00	9.82	0.0
11	24	11.00	9.83	0.0
12	24	11.00	9.82	0.0
13	41	18.79	16.70	0.0
14	48	22.00	19.65	0.0
15	48	22.00	19.65	0.0
16	48	22.00	19.65	0.02
17	48	22.00	19.65	0.0
18	36	16.50	14.68	0.56
19	40	18.33	16.30	T
20	48	22.00	19.65	0.04
21	45	20.62	18.34	0.23
22	24	11.00	9.83	0.04
23	39	17.87	15.90	T
24	48	22.00	19.65	0.12
25	44	20.16	17.92	T
26	48	22.00	19.65	0.0
27	48	22.00	19.65	0.0
28	48	22.00	19.65	0.0
29	28	12.83	11.40	0.0
30	24	11.00	9.82	0.0
Total	1155	529.34	472.89	1.56
Average	38.5	17.64	15.76	....

RECORD OF PUMPAGE FOR THE EAST SIDE SEWAGE PUMPING STATION, COLUMBUS, OHIO.
JUNE, 1913.

Date.	Pump. Hours.	Theoretical Pumpage (Million Gallons.)	Actual Pumpage (Million Gallons.)	Rainfall.
1	12	1.50	1.19	0.39
2	17	2.12	1.69	0.0
3	1	.12	.99	0.16
4	17	2.12	1.69	0.0
5	24	3.00	2.38	0.0
6	24	3.00	2.38	T
7	24	3.00	2.38	0.0
8	24	3.00	2.38	0.0
9	24	3.00	2.38	0.0
10	24	3.00	2.38	0.0
11	24	3.00	2.38	0.0
12	24	3.00	2.38	0.0
13	24	3.00	2.38	0.0
14	24	3.00	2.38	0.0
15	24	3.00	2.38	0.0
16	24	3.00	2.38	0.02
17	24	3.00	2.38	0.0
18	20	2.50	1.99	.56
19	24	3.00	2.38	T
20	24	3.00	2.38	0.01
21	24	3.00	2.38	0.23
22	24	3.00	2.38	0.04
23	24	3.00	2.38	T
24	24	3.00	2.38	0.12
25	24	3.00	2.38	T
26	24	3.00	2.38	0.0
27	24	3.00	2.38	0.0
28	24	3.00	2.38	0.0
29	24	3.00	2.38	0.0
30	14	1.75	1.39	0.0
Total	657	82.12	64.20	1.56
Average	22	2.73	2.14	....

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, this report was adopted.

The Secretary was directed to furnish the director of public service of Columbus with a copy of the report and to notify him that the Board would require that improved and more constant operation, or, if necessary, additional equipment of the sewage pumping stations be provided to pump the entire dry weather flow of sewage to the sewage treatment plant to prevent the pollution of the Scioto River and Alum Creek by raw sewage.

The Board also fixed the second day of September, 1913, as the time when the city of Columbus, might have an opportunity to be heard and to show cause, if any existed, why the city should not be required to cease polluting the waters of the Scioto River, and Alum Creek by the discharge of untreated sewage into said streams.

At a meeting held September 2, 1913, after hearing statements regarding the operation of the sewage pumping stations and the sewage treatment works of the city of Columbus, Ohio, from Mr. Jerry O'Shaughnessy, superintendent of the division of sewage and water, and Mr. C. B. Hoover, chemist in charge of the division of sewage disposal, who represented the director of public service of the city, the State Board of Health adopted the following resolution:

"*Be it resolved,* That the sewage pumping and treatment facilities of the city of Columbus, Ohio, are not adequate to properly serve the purpose for which these works were intended; that sufficient funds should be provided to maintain the operation of the present works throughout the year; and that the city of Columbus, Ohio, should provide sufficient funds to install the additional pumping and treatment equipment which is needed."

REPORT ON PROPOSED METHODS OF DISPOSAL OF SEWAGE SLUDGE AT COLUMBUS.

On July 31, 1913, a communication was received from Mr. S. A. Kinnear, director of public service of the city of Columbus, in which an outline was given of a proposed method of sludge disposal to be used at the Columbus sewage treatment works. On August 22, 1913, one of the assistant engineers visited the sewage treatment plant in order to become more familiar with the proposed method of sludge disposal. Based upon the information available in the engineering department of the State Board of Health, together with that which was obtained at the time of the inspection, the following report was prepared:

The sewer system of Columbus may be briefly described by dividing it into three main divisions or units. The first division includes the area which lies to the east of the Scioto and Olentangy Rivers. The sewers in this portion of the city flow by gravity to the main intercepting sewer which extends along the river front to the main sewage pumping station, located to the south and west of the city. Storm water overflows are provided along the entire length of the intercepting sewer so that at times of storm flow large quantities of the combined sewage is discharged directly into either the Scioto or Olentangy Rivers. The extreme easterly portion of the city is provided with combined sewers with an outlet which formerly discharged into Alum Creek, just to the south of the Main Street bridge. In order to prevent the pollution of Alum Creek a low dam was placed in the main sewer and a pumping station installed on east Main Street. The pumping equipment is used to pump the dry weather flow from the main sewer across the divide into the Town Street sewer through which it flows by gravity to the main interceptor leading to the main pumping station. The dam placed in the Main Street sewer is low and when the river stage reaches an elevation of 59 feet, as referred to the city datum, the pumps are stopped and the sewage is permitted to discharge into Alum Creek. Considerable nuisance has been created in Alum Creek due to the discharge of the raw sewage into the creek at times of low flow. The third division includes the sewers of the west side. In this district the sewers are constructed on the separate plan. Both sanitary and storm sewers have their outlet at the main pumping station.

As noted from the above, the sewage from the first division and the sewage from the Alum Creek division may be either by-passed or overflowed directly into the river. At extreme high water this is impossible on the west side, and it becomes necessary not only to pump the sanitary sewage, but also a large quantity of the storm water at such periods in order to provide adequate drainage for this lower lying portion of the city.

Actions of the State Board of Health. In 1900 the city of Columbus presented a plan for sewerage improvements to the State Board of Health. The State Board of Health, however, was not entirely satisfied with the proposed installation and at the January meeting in 1901, voted to disapprove the plans. At the same time, however, a recommendation was made that the city install an experimental sewage treatment plant in order that definite information concerning the Columbus sewage and the proper method for its treatment might be obtained. On September 23, 1905, following experimental studies made by the city, the State Board of Health approved the general plans of the existing plant with two conditions: the first required the city to submit detail plans for the proposed improvements, and the second condition related to the method of sludge disposal which was to be changed at such a time as the State Board of Health deemed such a procedure necessary. On October 25, 1905, the State Board of Health approved the detail plans for the sewage treatment works and at the same time emphasized the second condition of approval of September 23, 1905, regarding the method of sludge disposal.

Description of Plant. It will be unnecessary to describe the pumping stations or to give details concerning the treatment works proper, as all such information may be obtained from a paper on The Improved Water and Sewage Works of Columbus, written by Mr. John H. Gregory and published in the Transactions of the American Society of Civil Engineers, Vol. 47. The works were designed to treat 20 million gallons of sewage per 24 hours. The plant in brief consists of four primary sedimentation tanks which according to Gregory in the Transactions of the American Society of Civil Engineers, Vol. 47, page 294, have a combined capacity of 2,840,000 gallons, or a capacity for each single unit of 710,000 gallons. In addition to the primary tanks two secondary tanks are provided each of which has a capacity of 2,590,000 gallons, or a total of 5,180,000 gallons. The effluent from the septic tanks is discharged onto the surface of the sprinkling filters which are divided into four units, each unit having an area of 2.5 acres or a total area of 10 acres. The effluent from the sprinkling filters is passed through final settling tanks, two of which are provided, each of which has a capacity of 2,000,000 gallons. The effluent from the final settling tanks is discharged into the Scioto River.

Operation. The sewage treatment works is designed to care for the dry weather sewage flow of the city of Columbus, and at the present time has a capacity of 20,000,000 gallons per day. One of the most serious problems which has had to be met by the operators of the sewage plant is the disposal of the sludge. As the plant was designed it was intended to discharge the sludge into the Scioto River at times of flood stage, which according to the present operator, can be accomplished only when a stage in the river equal to 12 feet or more is obtained. In Table No. 1 will be found the periods of flood stage at which times the Scioto River has had a stage of 12 feet or more.

TABLE NO. 1.

Date. (Inclusive)	*Number of Days Between Flood Stage.*
1907.	
Dec. 31, 1906 — Jan. 2, 1907	.....
Jan. 4 — Jan. 10	1
Jan. 15 — Jan. 23	4
Mar. 13 — Mar. 18	48
Mar. 20 — Mar. 22	1
Apr. 26 — Apr. 27	34
May 26 — May 28	28
June 2 — June 6	4
June 8	1
July 17 — July 21	38
July 27	5
Dec. 24, 25	149
Dec. 31	5
1908.	
Jan. 1	...
Feb. 6	35
Feb. 13 — Feb. 19	6
Mar. 2 — Mar. 11	11
Mar. 19 — Mar. 22	7
Apr. 8 — Apr. 11	16
May 6 — May 10	24
1909.	
Feb. 15 — Feb. 16	280
Feb. 21 — Feb. 26	4

Date. (Inclusive)	*Number of Days Between Flood Stage.*
April. 7 — Apr. 8	39
May 1 — May 2	22
May 10 — May 13	7
Aug. 16 — Aug. 17	94
Dec. 14 — Dec. 15	118
1910.	
Jan. 14 — Jan. 15	29
Jan. 18 — Jan. 23	2
Feb. 16 — Feb. 17	23
Feb. 27 — Feb. 28	9
Mar. 1 — Mar. 7	...
May 4	57
Oct. 7 — Oct. 9	155
Dec. 30 — Dec. 31	81
1911.	
Jan. 3	2
Jan. 13 — Jan. 16	9
Jan. 28 — Jan. 31	11
Feb. 5	4
Apr. 5 — Apr. 7	58
May 2 — May 3	24
Oct. 18 — Oct. 19	167
Nov. 19	30
Dec. 10 — Dec. 17	20
1912.	
Feb. 21	65
Feb. 26 — Feb. 29	4
March 1	...
Mar. 15 — Mar. 22	13
Mar. 24 — Mar. 31	1
April 1, 5	...
June 17 — June 18	72
1913.	
Jan. 7 — Jan. 15	202
Jan. 17 — Jan. 26	1
Feb. 28	32
Mar. 1	...
Mar. 25 — Mar. 31	23
Apr. 1	...
Apr. 4 — Apr. 7	2
Apr. 11 — Apr. 12	3
April 14 — Apr. 15	1
No flood stage to date, Aug. 26, 1913	133

From the above table it will be observed that the greatest period elapsing between two flood stages was 280 days, which occurred from May 10, 1908, to February 15, 1909. The plant was not in operation during this entire period as it was first placed in operation in November 1908. No difficulties were, therefore, encountered. The longest period of low water, other than the one just mentioned, occurred from June 19, 1912, to January 7, 1913, a period of 202 days. In a letter dated July

28, 1913, signed by Mr. C. B. Hoover, chemist in charge of the sewage plant, it was stated that in order to get a satisfactory clarification of the raw sewage that it is necessary to operate the preliminary tanks as plain settling tanks, and when so operated they give good service for about four or five weeks after which time they should be cleaned. He further states, "Intensively active sludge decomposition begins between the fourth and sixth week after a tank goes into service, and after this condition is established the tank is valueless for its clarification purposes and no longer provides efficient preparation for the subsequent sprinkling filter treatment." From this statement the necessity is recognized of frequent cleaning of the sedimentation tanks in order to remove sludge deposits and provide for efficient operation of the plant. From Table No. 1 it will be observed that the flood stages at which time the sludge may be discharged into the river come at infrequent intervals, and at such great periods that it is necessary to clean the tanks at times when it is impossible to discharge the sludge directly into the stream without creating objectionable conditions in the same. Table No. 2 gives the dates and stages of the river when the septic sludge has been discharged.

TABLE NO. 2.

Disposal of Sludge.

Date.	*Stage of River City Datum.*	*Period Between Cleanings. In Days.*
1909.		
May 11, 12, 13	18.6, 15.6, 13.6	....
Aug. 16, 17	12.8, 12.6	94
Dec. 14, 15	13.7, 12.6	118
1910.		
Jan. 20, 21, 23	17.2, 16.9, 12.3	36
Mar. 3, 4, 5	18.7, 16.0, 14.2	38
June 11	9.4	97
Oct. 7, 8, 9, 10	19.2, 16.3, ..., 11.8	129
Dec. 30, 31	13.7, 12.8	80
Jan. 12	8.0	12
Jan. 28	13.1	16
Apr. 5, 6	12.8, 14.8	66
1911		
May 2	13.8	25
July 29*	5.7	87
Aug. 23*	5.8	24
Aug. 26*	6.0	2
Aug. 28*	6.0	1
Sept. 10, 11*	6.7, 6.7	13
Sept. 22, 23, 24*	7.0, 6.8, 6.8	10
Oct. 11*	8.2	16
Oct. 19, 20	12.1, 10.4	7

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*So much difficulty was encountered with the operation of the plant in being unable to discharge sludge into the river, that one of the settling basins was prepared for the storage of sludge. On the dates indicated, sludge from the settling tanks was discharged into the north final settling tank.

Date.	*Stage of River City Datum.*	*Period Between Cleanings. In Days.*
1912*.		
June 17, 18	16.0, 16.0	241
Aug. 23	.....	65
Oct. 11	.....	48

Tables Nos. 1 and 2 give in detail the condition of the Scioto River and the periods during which sludge has been discharged into the river. These data, together with the information included in the statement of the chemist, in charge of the plant, permits of but one conclusion, namely that the method of sludge disposal used at the Columbus sewage treatment works at the present time is unsatisfactory, and that some better method for the treatment of the sludge is necessary.

Proposed Methods of Sludge Disposal. In a letter under date of July 28, 1913, three methods of sludge disposal are proposed. The first method is to dispose of sludge in flood water, whenever this practice is warranted and when river conditions are not favorable to resort to sludge storage and subsequently to dispose of the stored material when river conditions are right. In order to provide storage for the sludge it is proposed to discontinue the use of two of the primary tanks and if necessary one of the secondary tanks as sedimentation devices and to use the same for sludge storage. Two primary tanks would have a capacity of 1,420,000 gallons which combined with one of the secondary tanks would make a total capacity of 4,010,000 gallons.

The sewage plant treats on an average 17,000,000 gallons of sewage per day, and estimating a sludge accumulation from the sewage flow and analytical results obtained, it is found that the sludge accumulation is between 20,000 and 25,000 gallons per day. This quantity appears to be high, and when the assumption is made that 10.5 cubic feet of sludge is produced per 1,000 population per day with combined sewers, the quantity of sludge estimated is reduced to 14,000 gallons per day. With this latter estimate 4,000,000 gallons storage will provide for 286 days retention, which is practically equal to the maximum period between flood water stages, that is, between the occurrence of 12 foot stages in the Scioto River measured at the gage at the sewage plant. Taking the accumulation of sludge as 25,000 gallons per day, the storage period provided by the two primary and one secondary tanks is reduced to 160 days. It will be observed, therefore, that it will be necessary to provide at least a capacity of 4,000,000 gallons. The method to be employed is to install pumps which wil raise the sludge from the tanks which are to be used as plain sedimentation tanks and discharge the same into the tanks which are to be converted for sludge storage.

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*Owing to the same difficulties mentioned in the note above, the sludge during 1912 was discharged into an abandoned gravel pit located just to the north of the sewage treatment site. Sludge has been discharged by gravity into this pit.

The second proposal is to dispose of the sludge directly in flood water whenever this practice is warranted and resort to sludge drying beds whenever flood water is not available.

The third proposal is to abandon the disposal of sludge in flood water and construct modern sludge drying beds. This latter proposal is by far the most ideal condition and is one which would insure the proper treatment of the sludge at all times. Certain difficulties would be encountered, with this method particularly during the winter and spring when extreme cold and wet weather is experienced. As stated in the letter of July 28, 1913, the finances of the city of Columbus at the present time will not permit of the expenditure of a large amount of money, which extensive tank changes or the construction of sludge drying beds will necessitate. Under the present conditions, therefore, it would seem that the most economical method for the disposal of the sludge is to use two of the primary and one of the secondary tanks for sludge storage, with the sludge flushed into the river at the time of flood stage. The capacity available with the three tanks is four million gallons and it is probable that this capacity will be insufficient to store the sludge for periods equal to the maximum length of time between flood stages. The possibility of such a condition is emphasized by the fact and it would be necessary to pump considerable sewage with the sludge in order to transfer the deposits from the tanks in service to the sludge storage tanks. It might be possible to install an auxiliary pump to remove the supernatant liquid from the sludge storage tanks back to the sedimentation tanks. If such an arrangement is provided it may be possible to store the sludge for a sufficient period to cover the low water season.

Scioto River. It is surprising to note that the only references to the stream flow of the Scioto River at the Columbus Sewage plant made in the report on Sewage Purification at Columbus, by Geo. A. Johnson, 1905, is on pages 4, 132, 327. On page 4 the area of the drainage basin of the Scioto and Olentangy Rivers is given as 1,665 square miles, and the stream flow below the city of Columbus as ranging from 30 to 50,000 cubic feet per second for extreme low and high water conditions. On page 132 the statement is made that a dilution of the sludge including that from the septic tanks requires 8800 volumes of river water to one volume of sludge. On page 327 it is stated that the final disposal of the sludge from preparatory treatment involving sedimentation is perfectly feasible upon land adjoining the purification works. It is also pointed out that the advantages of the septic process are that it is the only process in which the sludge can be satisfactorily allowed to accumulate within the purification works themselves so that it can be disposed of during flood stages in the river. This means that in practice the septic tanks should be of such size that the sludge can be readily allowed to accumulate in the tanks for eight months or more, or from the high water stages of the early spring, until rains again produce high water late in the following autumn or winter. In discussion of John H. Gregory's paper in the Proceedings of the American Society of Civil Engineers, by Mr. C. B. Hoover the following table giving the flow in the Scioto River is found:

TABLE NO. 3.

Days during 1909, when the river was in condition to receive sludge.	*Flow in river in cubic feet per second.*	*Number of days intervening between opportunities for sludge disposal.*
February 15th and 16th............	840 to 3,300	77
February 20th to 28th..............	6,200 to 34,700	4
April 6th, 7th, and 8th.............	5,700 Mean	38
April 30th, May 1st, 2nd...........	10,000 Mean	22
May 10th, 11th, 12th, 13th.........	9,800 Mean	8
August 16th and 17th................	....	95
December 14th and 15th............	4,200 Mean	118

In the Fourth Annual Report of the Division of Sewage Disposal of Columbus, page 4, is found the following extract from a report by Mr. Julian Griggs and Mr. John W. Alvord.

> " * * * The flood flow of the Scioto River below Columbus, easily and often reaches 30,000 to 40,000 cubic feet per second, rising from 15 to 18 feet above low water. The flood of March 23, 1898, which was the greatest and most disastrous on record, is believed to have passed fully 75,000 cubic feet per second at its maximum stage. * * * * The average flow for six months of the wet season is about 600 cubic feet per second, during which time it seldom falls as low as 250 cubic feet per second. In dry weather of summer and autumn, on the other hand, the flow is very small. During 1897, for August, September, and October, its average was about 30 cubic feet per second, and consisted of but little more than the sewage of the city, slightly diluted."

NOTE:—Estimated discharge March 25, 1913, 125,000 second feet.

At the present time the city has secured the services of an engineer for the purpose of gaging the Scioto River at the sewage treatment plant, and of obtaining accurate data concerning the flow of the river. As soon as this work has been completed, a much more definite statement can be made as to the periods during which the sludge can be discharged into the Scioto River. At the present time practically no information is available.

SUMMARY.

The present method of sludge disposal at the Columbus sewage treatment plant is unsatisfactory and at certain seasons of the year, objectionable conditions are created by the method used in handling sludge.

It is impossible with the present equipment to handle the sludge in any other manner than is at present in vogue. After an investigation by the State Board of Health on July 2, 1913, the city department of sewage treatment presented a letter with three methods proposed as solutions for the problem. The first method is to dispose of the sludge in flood water whenever possible and to provide sludge storage to care for the material when river conditons are unsatisfactory; second to dispose of the sludge in flood water whenever possible and to use sludge drying beds at other seasons; and third to use sludge drying beds entirely. The last two methods are stated to be impossible by the city authorities at the present time owing to the lack of funds for such extensive improvements. The first method and the fourth method mentioned at the time of the recent visit Aug. 22, 1913, are the ones held in favor by the local authorities. A fourth possible method is to drain the sludge to an abandoned gravel pit immediately to the north of the sewage treatment works. In order to use the first method it will be necessary to discontinue the use of two of the primary and one of the secondary tanks and use the same for sludge storage purposes. The combined capacity of the three tanks is approximately 4,000,000 gallons. It is not determined as to just what period of retention this capacity will provide owing to the fact that no accurate measurements of the sludge accumulation have been made. The two methods of estimating vary greatly ranging from 160 days to 286 days. The maximum period of low water observed since 1907 was 280 days. It will be necessary, therefore, to provide a storage capacity of at least 280 days sewage accumulation. Data concerning the flow of the Scioto River is practically lacking, the only figures available showing a variation of stream flow from 30 second feet during the extreme low water to approximately 125,000 second feet during extreme high water. Stream measurements are being made at the present time and when data are completed much more definite statements concerning the proper disposal of the sludge can be made.

ACTION OF THE BOARD.

At a meeting held September 2, 1913, the State Board of Health considered the proposed methods of sludge disposal at the sewage treatment plant at Columbus, outlined in a communication received from the director of public service July 31, 1913.

The Board withheld approval of the first and second proposed methods involving (a) disposal of sludge in flood water whenever this practice is warranted, and when the river conditions are not favorable, storage of sludge and subsequent disposal in flood water, and (b) disposal of sludge in flood water whenever this practice is warranted, and disposal by use of sludge drying beds wheneyer flood water disposal is not available; and granted approval of the third proposed method involving abandonment of disposal of sludge in flood water, and disposal by use of sludge drying beds, subject to the following conditions:

1st. That plans for sludge drying beds shall have been submitted to the State Board of Health prior to April 1, 1914, and that suitable sludge drying beds shall have been installed prior to September 1, 1914; and,

2nd. That the use of the first proposed method of sludge disposal involving disposal of sludge in flood water whenever this practice is warranted, and whenever river conditions are not favorable, storage of sludge and subsequent disposal in flood water, may be practised until sludge drying beds shall have been installed.

The authorities were notified that the Board was of the opinion that in the study of the problem of sludge disposal, consideration should be given to the advisability of providing for storage and digestion of the sludge prior to its discharge upon drying beds.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR SEWER DISTRICT NO. 1, CONNEAUT.

On March 19, 1913, plans for proposed additional sewerage for Sewer District No. 1, were received from Mr. A. W. Pelton, director of public service, accompanied by resolutions of the city council determining to proceed with the construction of the proposed sewers. The plans were referred to the engineering department and on April 28, 1913, the principal assistant engineer visited Conneaut and made an examination relative to the proposed improvement. The following report was submitted:

Conneaut, a city with a population of 8,500, is located in Ashtabula County on Lake Erie at the mouth of Conneaut Creek, which forms the southerly and easterly corporation line of the city. The water supply of the city is obtained from Lake Erie through an intake 845 feet from the shore and 1600 feet west of the mouth of Conneaut Creek. The supply is purified by a rapid sand filter plant before it is pumped into the mains. A breakwater extending 1,000 feet into the lake does much to protect the water supply from the discharges of Conneaut Creek.

EXISTING SEWERAGE.

At the present time the city is provided with an incomplete system constructed on the separate plan. The city has been divided into four sewer districts, three of which have been sewered. District No. 2, which includes a large residential section in the northwesterly portion of the city bordering the lake remains unsewered. The sewage is disposed of through four outlets, discharging into Conneaut Creek. The outlets are located as follows:

Outlet	*Distance Above Lake.*
District 3	1,000 feet
District 4	9,000 feet
District 1	11,000 feet
Sub.Dist. 1	13,000 feet

Backwater extends above the outlet for District No. 4 to a distance 10,000 feet from the lake.

There are approximately 12 miles of sanitary sewers to which more than 6,000 people are tributary. No gagings have been made to determine the sewage flow, but based upon the water consumption per capita, it is approximately 700,000 gallons per day.

Conneaut Creek which receives the sewage from the city has a watershed area of approximately 200 square miles and its dry weather flow probably does not exceed 6 cubic feet per second, which is totally inadequate to properly dilute the sewage of 6,000 persons. Below the limit of slack water the direction of flow is influenced by the elevation of Lake Erie. During low stages of the stream the sewage creates an extreme nuisance, and at all times it forms a menace to the quality of the water supply of the city, inasmuch as northeasterly winds may carry the polluted creek water to the intake. The presence of the breakwater and the operation of the water purification plant are not a sufficient safeguard as to the quality of the water furnished the consumers. There must also be a reasonable assurance that the raw water is not excessively polluted.

PROPOSED SEWERAGE.

The plans of the city engineer provide for the installation of 2,250 feet of 8-inch sewers to serve an ultimate population of 200 in a portion of District No. 1, which borders Conneaut Creek in the extreme southwesterly portion of the city, and which is at such a low elevation as to make it impossible to drain the sewers by gravity into the existing system of District No. 1. The plans include provision of a concrete covered settling tank 20 by 15 feet in plan and 10 feet deep. Its capacity is 22,500 gallons. The proposed outlet from the tank is submerged in Conneaut Creek at a point 4.4 miles above the lake.

Plans for sewers for this subdistrict were previously considered by the Board in 1910 and approved subject to the conditions that a submerged outlet be provided, and that the sewers be installed prior to January 1, 1912. At this time the attention of the authorities was called to the necessity of improvements for the disposal of the sewage of the entire city, and they were advised to have plans prepared for an intercepting sewer and to purchase a site for treatment works. Regardless of this advice, no steps have been taken to improve conditions. After the approval of the Board in 1910 the project of constructing the proposed sewers was abandoned and the approval became void January 1, 1912.

Relative to the proposed sewers it is probable that the condition of Conneaut Creek at its mouth would not be rendered worse by the discharge of a small quantity of sewage from the proposed sewers. The maximum population which may become tributary is 200 and the sewage flow will probably not exceed 20,000 gallons. However, it is not advisable to permit the discharge of raw sewage or a tank effluent into the stream which has a low flow during dry weather, and which is used to some extent for bathing purposes at points below its outlet. Furthermore, the question of proper disposal of sewage from the entire city requires attention immediately, and it is possible that the proposed sewers may be connected with an intercepting sewer to collect the sewage from all existing outlets.

ACTION OF THE BOARD.

At a meeting held May 22, 1913, the State Board of Health disapproved plans for proposed additional sewerage for Sewer District No. 1, Conneaut, submitted by Mr. A. W. Pelton, director of public service, on March 19, 1913.

The attention of the city officials was called to the following facts:

In a previous action of the State Board of Health, July 27, 1910, the city authorities were advised to take steps to improve conditions attending the discharge of sewage into Conneaut Creek, which advice was disregarded.

The discharge of untreated sewage from Conneaut creates a nuisance in Conneaut Creek in dry weather, and at all times is a menace to the water supply of the city. And in the opinion of the Board no additional sewage should be discharged into the creek unless efficient sewage treatment works are provided, although it is probable that the sewage to be discharged from the proposed sewers will not greatly increase the pollution of the creek.

The authorities were also advised to engage a consulting sanitary engineer and have prepared plans for proper disposal of the sewage of the entire city.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT PLANT FOR A HIGH SCHOOL BUILDING AT CONVOY.

On July 5, 1913, an examination was made of the conditions at a high school building at the corner of School and Sycamore Streets, in Convoy. On July 1, 1913, general plans and specifications and on August

12, 1913, detail plans for a proposed sewage treatment plant for this building were received from the American Warming and Ventilating Company, with a request for approval, and were referred to the engineering department for examination. The following report was submitted:

Convoy, a village of 741 inhabitants, is located in the central portion of Van Wert County on the main line of the Pittsburg, Ft. Wayne and Chicago Railroad, a division of the Pennsylvania. It is on the watershed of the Auglaize River, not far from the St. Marys River divide. There are no watercourses of any size within the village and none sufficient to care for the village sewage. Some of the sewage is disposed of by means of water carriage through a storm sewer which ultimately discharges into a county ditch. The topography is generally flat.

An examination of the plans submitted July 1, 1913, indicated the omission of several important details, which were not obtained until revised plans and specifications had been submitted on several occasions. The final set was received on August 12, 1913.

The storm water sewer mentioned above is 18 inches in diameter and it passes north along School Street past the school house in question. This school house now contains closets of the Smead system which having worked unsuccessfully have been condemned by the state inspector of buildings. It is, therefore, proposed by the school committee to install a system of water closets and running water in the building, the wastes from the closets to be treated in a similar manner to the present installation in Ohio City. The work is to be completed before the opening of school in the fall of 1913. The consulting engineers and contractors are The American Warming and Ventilating Company of Toledo, the same who designed the Ohio City installation.

The school building is a substantial brick of two stories and basement. There are 200 pupils enrolled. The school session is about nine months of the year, five days a week and six hours per day, the school being closed during the summer months. It is proposed to treat the wastes from the school building and discharge the effluent into the adjacent storm water sewer.

The water supply will be obtained from a well located in the school yard in front of the building and lifted by air from the basement.

PROPOSED SEWAGE TREATMENT PLANT.

The plant will consist of a septic tank and subsurface sand filtration bed. From the back wall of the school building to the septic tank in a northerly direction the distance will be 142 feet 9 inches. The filter bed will be about 6 feet east of the septic tank, the easterly edge of the filter bed 6 feet from the School street property line and the northerly edge 6 feet from the back property line. It is apparent that no new property has been purchased, as originally proposed, and that the plant will be placed so as to disturb the present playground. There are a few large shade trees on or close to the site which may seriously affect the successful operation of the plant.

Septic Tank. The septic tank is to be 6 feet by 6 feet in plan with a depth of 8 feet. The walls are to be of 8-inch concrete construction, the bottom concrete 9 inches thick and the top with 6 inches of concrete with two 20 inch manholes, ventilation being provided by perforating the manhole covers. A central underflow baffle is placed in the septic tank six feet from the top and two feet from the bottom. The baffle is to be constructed of concrete four inches thick. The flow line of the septic tank is 1.6 feet below the outlet from the building, giving a slope of 1.3% to the 6-inch vitrified crock tile. The capacity of the septic tank below the flow line is 1,550 gallons, which will provide a storage period of 36 hours or more, on the basis of the Ohio City installation of 1,500 gallons for an enrollment of 340 pupils or about 900 gallons per day for an enrollment of 200 pupils. The sewage enters and is discharged from the septic tank through inverted elbows which act as baffles to prevent the escape of gas and clogging by scum.

Filtration Bed. The filtration bed is to be 60 by 30 feet in plan. The plans call for a depth of 4 feet 6 inches below the surface, to the bottom of the bed. The depth of sand is to be 2 feet 6 inches at the edge and slope 6 inches to the center, making the maximum depth 3 feet. On the surface of the sand is to be placed 2 feet or more "common dirt" the surface to be flush with the surface of the ground. Ventilation of the bed is to be accomplished by 6-inch vent pipes placed 1 inch to 2 inches in the sand layer and extending 3 inches above the ground. There are to be 5 rows of these pipes 5 feet apart. The pipes in each row are 6 feet apart. Distribution is to be accomplished by means of two rows of 6-inch vitrified crock tile on each side of the filtration bed. No method of escape is shown for the sewage, although U tile is mentioned in the specifications. The bottom of the bed is to be on a natural clay soil, drainage to be accomplished by means of one 6-inch farm drain laid in the middle of the bed with no laterals, with a slope of 1.7%. The effluent from the drain enters the storm sewer through a 6-inch vitrified tile 12 inches above the bottom of the storm sewer with a slope of 1.0%.

The design of the filter will provide for about 4800 persons per acre per day, or about 2600 persons per acre foot per day. On the basis of 900 gallons of sewage per day, the rate will be 12,000 gallons per acre per day. The rate per acre foot per day will be 6,000 gallons on the basis of an average filtering depth of 24 inches or 6.7 gallons per cubic yard of filtering material. These figures are not definite, however, because of the presence of short distances through the filtering material from the distributing pipe to the drain pipe.

Storm Water Sewer. The sewer into which this drain empties extends some 1,700 feet in northwesterly direction to its outlet into an open drainage ditch.

SUMMARY AND CONCLUSIONS.

A Smead system of closets in the school building is to be replaced by a system of water closets. No sanitary sewers are available. The sewage will, therefore, be treated by a septic tank and a filtration bed, the effluent to be discharged into a storm sewer. The installation is to be similar to that of Ohio City. The plans have been frequently revised, those now submitted showing all details necessary. The slope on the sewers is adequate for proper scouring. The septic tank has a period more than sufficient to care for one day's flow, and the rate on the filter beds of 12,000 gallons per acre per day, or 6.7 gallons per cubic yard of filtering material per day, is not too high. The thickness of the filtering material is not sufficient to obtain proper results because the distribution tile is embedded in the filtering material. A continuous dosing will take place which will provide uneven distribution and cause a short circuit of sewage through the filter bed to the drain pipe. The bed should be deepened 1 foot, which will allow the effluent drain to enter the storm sewer at grade, instead of 1 foot above, as at present.

ACTION.

Under date of September 9, 1913, the Secretary of the State Board of Health approved the plans for proposed sewerage and sewage treatment plant for the high school building at Convoy, received August 12, 1913, from the American Warming and Ventilating Company of Toledo, subject to the following conditions:

1st. That the plant shall be abandoned and removed whenever a sanitary sewer shall have become available for the removal of the sewage from the school building.

2nd. That a course of graded gravel be placed immediately surrounding the distributing and underdrainage lines.

3rd. That the sludge be removed from the tank at intervals not greater than one month during the school year.

The board of education was advised that an additional depth in the filter be provided by utilizing completely the grade to the invert of the storm sewer which will serve as an outlet.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR COSHOCTON.

On August 28, 1913, plans and specifications for proposed additional sewerage for Coshocton were received from Mr. A. M. Fisher, city engineer. These plans and specifications were referred to the engineering department and on September 23, 1913, the Chief Engineer visited Coshocton and investigated the proposed improvements. The following report was submitted:

Coshocton, a city with a population of 10,500, is located in Coshocton County at the confluence of the Tuscarawas and Walhonding Rivers, which join at a point west of the northerly portion of the city to form the Muskingum River. The entire city lies south of the Tuscarawas River and east of the Muskingum River and is located principally in the valley of these streams. The topography is rather level and drainage takes place in a northerly direction to the Tuscarawas River and in a westerly direction to the Muskingum River. In the way of municipal improvements the city is quite progressive and is provided with a public water supply of good quality, a large percentage of paved streets, and a fairly complete system of sewers constructed on the separate plan.

EXISTING SEWERAGE.

The present sewerage system of the city includes about 15 miles of sanitary sewers, which cover all but the south-westerly portion of the city. The sewers have been well constructed, following the separate plan almost entirely, and discharge through a single outlet into the Muskingum River opposite the central portion of the city. The outlet sewer is an old combined sewer of brick construction, 36 inches in diameter, but all laterals and extensions from this sewer are constructed as sanitary sewers. Surface water from several small districts, poorly drained and not provided with storm sewers, is tributary to the sanitary sewer system. The flow of sewage during rainfall is, therefore, excessive. It is estimated that the present sewer accommodates about 7,500 persons. No measurements have been made to determine the sewage flow at the outlet.

On the day of the examination, September 23, 1913, the sewage discharged at the outlet was noticeably discoloring the stream in the vicinity. At a distance of a few hundred feet below the outlet, however, no pollution was apparent. The stream at this time appeared to be at about mean summer stage.

PROPOSED ADDITIONAL SEWERAGE.

In the southwesterly portion of the city a district having an area of about 400 acres is lacking sewerage facilities and it is now proposed to construct a system of sanitary sewers to improve the sanitation of this district. The population at the present time is estimated at 2,000 and the ultimate population, at 15 persons per acre, will be 6,000. The sewerage system is designed upon this basis. One hundred and ten acres of the district will be immediately sewered and ultimately the sewers will be extended to serve the entire 400 acres. The estimated sewage flow in the immediate future is 150,000 gallons, and the ultimate sewage flow may reach 600,000 gallons when the entire area of 400 acres shall have been sewered and completely built up.

The sewerage to be constructed immediately will consist of some 19,000 feet of sewers varying in size from 8 inches to 20 inches in diameter. Of this length 5,100 feet comprise a main outfall sewer 18 inches and 20 inches in diameter leading in a westerly direction from the southerly limits of the district to an outlet into the Muskingum River. The lower portion of the outfall sewer has a capacity of 1,380,000 gallons per 24 hours flowing half full. The general design of the sewers is in accordance with good engineering practice; 43 manholes and 12 flush tanks being provided. The grades are sufficient to secure a cleansing velocity with the use of flush tanks.

The point of outlet proposed is 4,500 feet south of the existing main sewer outlet and some 2,500 feet southwest of the corporation line of the city. Its location is satisfactory as regards the proximity of built up districts, and owing to the low elevation of the land for a distance of 2,000 feet east of the river, it is not likely that any buildings will be constructed in the future within 1,000 feet of the outlet.

Above the point of outlet the watershed area tributary to the stream is 4700 square miles, made up of the drainage areas of the Walhonding River (2200 square miles)and the Tuscarawas River (2500 square miles). No complete flow measurements of the Muskingum River are available. In the report of the Engineer of the State Board of Health, dated March 14, 1911, data from the 1899 and 1904 Annual Reports of the Board are used to indicate low discharges at Coshocton of 116 and 120 second feet. Based upon an empirical formula (minimum discharge in cubic feet per second equals 0.03 times watershed area in square miles), the minimum flow at Coshocton is indicated to be 141 cubic feet per second. Assuming the minimum flow of the stream as low as 100 cubic feet per second it is sufficient at such times to dilute, without nuisance, the untreated sewage from a population of 25,000, which with the present rate of growth will not be reached by the city of Coshocton until between 1950 and 1960.

The question of principle importance in considering the discharge of untreated sewage at Coshocton is the proximity of the water supply intake of Zanesville some 30 miles below Coshocton. The typhoid fever statistics for Zanesville show that the water supply is of unsafe character and the infection is no doubt largely traceable to the sewage discharged at Coshocton. However, it should be stated that even with removal of all polluting influences at Coshocton the water supply of Zanesville would still remain unsafe. Nevertheless it is reasonable to demand that every precaution be taken to prevent undue contamination of the Muskingum River.

Recently steps have been taken by the State Board of Health and by various communities on the streams above Coshocton to improve the conditions attending the discharge of sewage. Plans have been made for sewage treatment plants at Mt. Vernon, Canal Dover, New Philadelphia, Canton, and several other smaller communities. It would, therefore, appear that Coshocton should be required to do its part in maintaining the purity of the Muskingum River and preventing its pollution.

Relative to the degree of treatment which the sewage would require, it is evident that the question of a nuisance does not enter. It would, however, be advisable to provide a rough treatment, which would remove the solids from the sewage and prevent floating and suspended material from entering the stream. The effluent from such a device should be disinfected to destroy the infectious organisms, which might contaminate the public water supply of Zanesville. The city should be required to install a plant providing a degree of treatment as outlined.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held October 15, 1913, these plans for additional sewerage for Coshocton, received from Mr. A. M. Fisher, city engineer, August 28, 1913, were disapproved.

The mayor and council were informed that while the general design of the proposed additional sewers was satisfactory, the State Board of Health would not permit their installation until steps had been taken to provide a sewage treatment plant to serve the entire city; such plant to include as its main features, devices for clarification and disinfection of the sewage.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT WORKS FOR EAST PALESTINE.

On February 13, 1913, plans and specifications for proposed sewerage and sewage treatment works for East Palestine were received from Mr. L. E. Chapin, consulting engineer for the village. On February 14, 1913, a request for approval of the plans was received from Mr. Everett L. Lyon, mayor. Preliminary investigations relative to proposed sewerage for East Palestine were made by representatives of the engineering department on May 6, and June 11, 1912. The plans and specifications were referred to the engineering department and the following report was submitted:

East Palestine, a village with a population of about 3500, is located in the extreme easterly portion of Columbiana County about two miles from the Pennsylvania state line. The village is located on Leslie Run, a minor tributary of North Fork Little Beaver River, which enters the Ohio River five miles above East Liverpool. The topography of the village is rather hilly, the drainage taking place through two small streams, known as Sulphur Run and Valley Run. The village is provided with a public water supply and has a few miles of paved streets. Sewerage facilities are, however, almost entirely lacking. Several storm sewers have been constructed by the village and a number of private drains have been installed. These empty into the two runs mentioned and during dry weather extreme nuisances are caused. In addition to the domestic wastes, these runs receive some industrial wastes from potteries, which wastes contribute to the unsightly condition of the streams.

In 1894 an investigation by the State Board of Health revealed the unsanitary condition of Sulphur Run and the village was advised to install a system of sanitary sewers. This advice was, however, not heeded. In 1911 another investigation was made and Sulphur Run was found to be in an extremely unsanitary condition. Advice was again given that sanitary sewers be installed.

During 1912 the village authorities decided that it would be necessary to install sewerage facilities and engaged the services of an engineer to prepare plans. The plans which have been presented provide for the installation of sanitary sewers and sewage treatment works.

PROPOSED SEWERAGE.

The sewerage system as designed will cover all built up portions of the village and will permit extensions with future growth. Vitrified sewer pipe ranging in size from 6 to 12 inches in diameter will be used in the following lengths: 6-inch, 23,230 feet; 8-inch, 41,850 feet; 10-inch, 5,750 feet; 12-inch, 1,190 feet; total 13.6 miles. The rather high percentage of 6-inch pipe is accounted for largely by the necessity of doubling a number of lines along the existing paved streets. The 6-inch lines are generally used where steep grades are available. The sewer system will be constructed according to accepted standards. Manholes are provided at an average interval of 360 feet, and 36 flush tanks are to be installed for cleansing of the sewers. The joints will be sealed with cement to prevent the entrance of ground water.

The sewage will be collected at a point in the valley of Leslie Run in the southwesterly portion of the village, from which an inverted siphon of 10-inch cast iron pipe 1,670 feet in length will convey the sewage down the valley and across the stream to the treatment works.

PROPOSED SEWAGE TREATMENT WORKS.

The plans of the consulting engineer provide for the installation of treatment works comprising a screen chamber, settling tanks, primary contact filters, and secondary contact filters. The installation to be made at present is for a sewage flow of 250,000 gallons per day which is the present water consumption. This sewage flow is equivalent to a population tributary of 3300 at 75 gallons per capita. Provision is made for future extension to provide for a sewage flow of 400,000 gallons or a population of 5,300.

Site. The valley of Leslie Run below East Palestine offers small opportunity for the location of sewage treatment works. The site selected by the consulting engineer for the works is about 1,000 feet south of the southerly corporation line of the village, where an area on the east side of the stream about 700 feet long and 100 feet wide can be used. Immediately below this area on the opposite side of the stream is a tract of land of approximately equal area which may be utilized for future extension. The restricted area of the site, however, has influenced the design of the treatment works and it has been necessary to confine the choice to sprinkling filters or single or double contact filters. Below the location selected the stream follows a narrow gorge for about one mile before another suitable area of bottom land is found. At this latter point treatment works of any type could be installed.

The site selected is well removed from habitation and roadways, and will probably remain secluded from built up portions of the village. The natural growth of the village is in a northerly direction due largely to topographical conditions. The elevation of the site is such that a portion near the stream is submerged during the highest floods. Diking will be resorted to to protect the treatment works.

Screen Chamber. The inverted siphon will discharge into an open concrete screen chamber 4 feet by 6 feet in plan and 2 feet in depth. The bottom of the screen chamber is at the elevation of the flow line of the tanks which will provide for its complete drainage. A single bar screen with one inch open spaces is provided.

Settling Tanks. The design provides for two uncovered settling tanks of the two-story type. Channels leading from the screen chamber provide that the tanks may be utilized either in parallel or in series. In series, however, tank No. 1 must receive the sewage first at all times. Additional flexibility of design should be provided to secure an equal sludge deposit in each tank. The tanks will be of concrete or brick construction, 20 feet in diameter by 23.5 feet in depth to the sludge pit. The settling compartments which have a capacity of 18,000 gallons each, provide 3.45 hours' retention when both tanks are in service. The average velocity of flow with both tanks in service will be 0.14 foot per minute. Efficient removal of solids should be obtained with proper operation of the tanks. The sludge compartments which have a capacity of 1100 cubic feet each provide for sludge retention of 140 days. This period will permit of proper operation. Eight-inch sludge piping is provided for removal of the sludge, the design showing a static head of 4 feet. Inasmuch as ample head is available this should be increased.

Sludge Filter. A sludge filter located near the tanks with an area of 1140 feet is shown on the plans. The area will provide for a population tributary of 3300. The filtering material will consist of 12 inches of sand supported upon 6 inches of gravel. The elevation of the surface of the filtering material is 10.5 feet below the flow line of the settling tanks.

Primary Contact Filters. The effluent from the settling tanks will enter a dosing channel of concrete construction, 6 feet in width, 2 feet 9 inches in depth, and 556 feet in length, extending along one side of the primary contact units. This channel has a capacity of 24,000 gallons and will serve as a dosing chamber for the primary contact filters, the application of the sewage to be controlled by automatic dosing apparatus. The primary contact filters will have an area of about 3,600 square feet each, and the average depth of the filtering material will be 3 feet 9 inches. With a sewage flow of 250,000 gallons, therefore, the rate of operation will be 750,000 gallons per acre, 200,000 gallons per acre-foot, and 124 gallons per cubic yard of filtering material per day. The filtering material proposed is broken and screened slag, varying in size from ½ to 3 inches. The void volume will be approximately 33,000 gallons in each unit so that there will be 1.9 cycles of operation per 24 hours. The effluent from the primary contact filters is collected in a system of underdrains discharging through automatic apparatus to the secondary contact filters. The underdrains are provided with ventilators, the use of which appear unnecessary and will prove undesirable in case of clogging of the filters.

Secondary Contact Filters. The four units of secondary contact filters are similar in design to the primary filters. They are placed parallel to and at a lower elevation than the primary filters and receive the discharge from them. The area, filtering material, underdrains, and other features are as described under primary contact filters and the method and rates of operation are the same. The effluent from the secondary contact filters is controlled by automatic apparatus, which permits of its discharge through two outlets into Leslie Run.

Automatic Apparatus. No plans are submitted for automatic apparatus and the type has not been definitely selected. It is of the utmost importance that automatic apparatus of suitable type be installed and that its operation at all times be ensured. Otherwise the plant as a whole cannot be expected to give satisfactory results of operation.

Leslie Run. This small stream which will receive the effluent from the proposed sewage treatment works has a watershed area above East Palestine of 11.5 square miles. The topography of the watershed is hilly and with the exception of the village is sparsely settled. The minimum dry weather flow of the stream does not exceed 0.5 cubic foot per second, and the normal summer flow as measured June 11, 1912, is about 1 cubic foot per second. It is evident that the proposed sewage treatment works must be operated efficiently to prevent the creation of a nuisance in the stream.

SUMMARY.

The provision of sewerage facilities for East Palestine will supply a much needed improvement in the sanitation of the village. The design of the consulting engineer provides adequate sewerage facilities and suitable means for treatment of the sewage. The local topographical conditions have influenced the design of the works and have made necessary the selection of a rather intricate type. By extending the main sewer about one mile down stream a site with greater area could be utilized and thus the installation of works of simpler type would be made possible. This, however, involves considerable expense. The operation of the double contact filters as designed is entirely feasible, but will require regular and intelligent attention. The construction of the works also will require constant inspection to secure suitable water tightness of the protecting walls of the filters and the proper installation of controlling apparatus. These points should be forcibly brought to the attention of the village authorities and their engineer.

ACTION OF THE BOARD.

At a meeting held March 20, 1913, the State Board of Health approved the plans and specifications for proposed sewerage and sewage treatment works for East Palestine, submitted by Mr. L. E. Chapin, consulting engineer, February 13, 1913, subject to the following conditions:

1st. That the proposed sewage treatment works be constructed before any connections to the sanitary sewers are permitted;

2nd. That the village council enact an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers, and providing for a proper official to supervise the maintenance of the sewers and treatment works; and that within two months after the completion of the sanitary sewers and treatment works, all existing connections in violation of the said ordinance be abandoned and removed;

3rd. That samples of all filtering material be submitted to and receive the approval of the Engineer of the State Board of Health;

4th. That details of automatic apparatus to control the operation of the contact filters be submitted to the State Board of Health;

5th. That the sewage treatment works be enlarged or otherwise modified when required by the State Board of Health; and,

6th. That this approval shall be void unless the proposed sewers and sewage treatment works shall have been installed prior to June 1, 1914.

The consulting engineer was advised as follows:

1st. To provide for equal sludge deposition the design of the settling tanks should make possible reversal of flow through the tanks when operated in series;

2nd. Increased head for sludge removal should be utilized; and,

3rd. The ventilators provided for the contact filters should be omitted.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT PLANT FOR FARMDALE.

On April 30, 1913, a plan for a proposed sewer and sewage treatment plant for Farmdale was received from Mr. F. A. Roberts, secretary of the Farmdale Improvement Association, which organization proposes to install the improvements. On May 26, 1913, the principal assistant engineer visited Farmdale and made an investigation in company with the designing engineer. The following report was submitted:

Farmdale, or Kinsman Station, is located in Trumbull County on Sugar Creek on the Beaver River watershed. The surface drainage reaches Sugar Creek which flows in a northerly direction about 900 feet east of the built up portion of the village. At the present time there are no public improvements. The water supplies are obtained from private wells penetrating the drift deposits to shallow depths. The desire for sewerage facilities has resulted from an increasing use of modern plumbing conveniences.

PROPOSED SEWERAGE.

The Farmdale Improvement Association proposes to install a sanitary sewer 8 inches in diameter, 1,070 feet in length extending along one of the streets of the hamlet, and furnishing sewerage facilities for eleven dwellings or an estimated population of 45. It is proposed also to utilize the sewer for the removal of roof water and cellar drainage. The roof water will have a beneficial effect in cleansing the sewer. Following the installation of the sewer it is probable that plumbing conveniences will be more generally used and it may be expected that the daily sewage flow will amount to 1,000 gallons.

PROPOSED SEWAGE TREATMENT PLANT.

The method of treatment adopted comprises a septic tank and a natural filter area. The tank is octagonal in plan, 12 feet in diameter, and 6 feet in depth to the flow line, giving it a capacity of 5,000 gallons or approximately five days' retention. The tank will be constructed of concrete and provided with a cover which will be flush with the surface of the ground. It will be located some 250 feet from the nearest dwelling and will cause no nuisance.

The contents of the tank will be removed at intervals by a small power pump and discharged upon an area located in the valley of Sugar Creek immediately east of the tank. The area to be utilized as a natural filter is four acres which will be underdrained by a 3-inch drain tile placed in lines 50 feet apart, and connected to an 8-inch main drain discharging into Sugar Creek. The soil is a heavy clay which will probably not serve as a filter medium. The application of sewage at the surface will no doubt cause ponding and will result in a nuisance. The presence of a dwelling adjacent to the filter area requires a more suitable and sanitary method of disposal. It is not likely that Sugar Creek would be polluted by the sewage effluent.

The proposed method of secondary treatment of the sewage is unsatisfactory and will probably create a nuisance. The septic tank is of suitable size to serve the population tributary and this feature of the installation may remain unchanged. A suitable secondary method of treatment should be provided either by the construction of intermittent sand filters or by the installation of suitable subsurface irrigation tile. In either case a dosing tank to provide intermittent discharge of the settled sewage should be added.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the plan for proposed sewerage and sewage treatment plant for Farmdale, received from Mr. F. A. Roberts, secretary of the Farmdale Implement Company, April 30, 1913, was approved subject to the following conditions:

1st. That devices, satisfactory to the Engineer of the State Board of Health, for secondary treatment of the sewage by intermittent sand filters or subsurface irrigation tile be installed before any connections to the proposed sewer for sanitary purposes are permitted; and,

2nd. That this approval shall be void unless revised plans incorporating a suitable design for secondary treatment of the sewage shall be submitted prior to August 1, 1913.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT WORKS FOR SEWER DISTRICT NO. 1, FRANKLIN COUNTY, NEAR COLUMBUS.

On January 18, 1913, plans for proposed sewerage and sewage treatment works for sewer district No. 1, Franklin County, were submitted by Messrs. Burgess and Long, consulting engineers. The plans were examined in the engineering department and the following report was submitted:

Sewer district No. 1, Franklin County, has recently been established by the board of county commissioners. It embraces territory lying immediately east of the city of Columbus, and includes an unincorporated suburban community, known as East Columbus within which is located the plant of the Ralston Steel Car Company. The westerly boundary of the district is formed by Alum Creek, which stream flows in a southerly direction forming the easterly corporation line of the city of Columbus.

East Columbus has a population at the present time of approximately 500, and is not provided with any improvements. The greater percentage of the population is employed at The Ralston Steel Car Company, a plant with some 800 employes. The area included within the community is about 55 acres which will comprise the territory to be sewered immediately.

The plans of the consulting engineers provide for the installation of 1.6 miles of sanitary sewers constructed of vitrified pipe ranging in size from 8 to 18 inches, the main sewer being carried in a northwesterly direction from the community to a point selected for the location of sewage treatment works.

To provide treatment of the sewage prior to its discharge into Alum Creek, it is proposed to install two-story tanks without secondary treatment. The site which has been optioned for the treatment works is a small tract of land 55 feet square located immediately north of the right-of-way of the old Columbus, Shawnee and Hocking Railroad, and about 200 feet east of Alum Creek. As regards its location the proposed site is unobjectionable, as it is well removed from habitations and is protected from view by the high railroad embankment to the south. The area of the site is, however, exceedingly small, so small in fact that the tanks will utilize it almost entirely. It will be impossible to construct a sludge filter without acquiring additional land.

The design of the treatment works provides for two, two-story tanks, each 25 feet 3 inches in depth from the flow line to the sludge pit with sedimentation compartments 22 feet in diameter and sludge compartments 12 feet in diameter. The sedimentation compartments have a capacity of 21,000 gallons each, which will provide a total period of retention of 4.3 hours, when the sewage flow is 240,000 gallons. The sludge compartments have a total capacity of 2,400 cubic feet, which will provide for four months' retention of the sludge from 3,800 persons tributary to the sewers. The sewage will pass through a small screen chamber before entering the tank, and after passing over the outlet weirs will be carried through a line to Alum Creek. Sludge piping is provided for removal of the sludge gases from the tank, but the plans show no suitable means of disposing of the sludge.

It may be reasonably expected that tanks constructed according to the design will remove a large portion of the suspended solids from the sewage, but it is impossible to secure a non-putrescible effluent.

Alum Creek into which it is proposed to discharge the clarified effluent has a watershed area of approximately 180 square miles and a minimum dry weather flow of not over 5 cubic feet per second. It is quite likely that the effluent from the tanks will receive insufficient dilution in warm weather to avoid the creation of offensive conditions in the stream. Below the point at which the effluent will enter the stream, Alum Creek passes along the easterly boundary of the city of Columbus, and the westerly boundary of the village of Bexley.

The land on both sides of the stream is becoming to be used as building sites for high class residences. It is, therefore, necessary that Alum Creek be maintained clean and unpolluted.

At a meeting held January 22, 1913, the State Board of Health disapproved the plans for proposed sewerage and sewage treatment works for Sewer District No. 1, Franklin County, submitted by Messrs. Burgess and Long, consulting engineers, January 18, 1913. The County Commissioners were informed that while the general design of the sewerage system was satisfactory a revision of the design of the treatment works would be required to incorporate some secondary process of treatment of the sewage.

On February 17, 1913, revised plans for proposed sewerage and sewage treatment plant for Sewer District No. 1, Franklin County, were submitted by Messrs. Burgess and Long, consulting engineers. The plans were examined in the engineering department and the following report was made:

PROPOSED SEWAGE TREATMENT PLANT.

The revised plans of the consulting engineers provide for the installation of a sewage treatment plant comprising settling tanks and contact filters. The plant is designed for a population tributary of 2,500, and a sewage flow of 240,000 gallons per day. The effluent from the plant will discharge into Alum Creek.

Site. The site, which is proposed for the location of a sewage treatment plant, is a tract of land about one acre in area, situated a short distance north of the right of way of the old Columbus, Shawnee and Hocking Railroad, immediately east of Alum Creek. The site is about three-quarters of a mile northwest of the center of East Columbus. The location of the site in unobjectionable as it is well removed from habitations. The nearest houses are in a westerly direction about 1,000 feet from the site. The likelihood of future building operations in the vicinity is slight owing to the presence of a high railroad embankment to the south. The elevation of the land is sufficient to protect the plant from high water in the creek.

Tanks. Preliminary treatment of the sewage will be provided by screens and tanks of the two-story type. The sewage first enters a screen chamber provided with a bar screen with 1-inch openings from which it may be diverted to either or both of two open concrete settling tanks. The tanks are each 25 feet 3 inches in depth from the flow line to the sludge pit, with sedimentation compartments 22 feet in diameter and sludge compartments 12 feet in diameter. The flow will be across the tanks. The capacity of the sedimentation compartments is 21,000 gallons each, which will provide a total retention of 4.3 hours when the sewage flow is 240,000 gallons. The sludge compartments will have a total capacity of 2,400 cubic feet, which will provide 180 days' retention of sludge with 2,500 persons tributary. Regarding the design of the tanks, it is believed that better displacement and consequently more efficient sedimentation would be obtained if the direction of flow were parallel to the circumference instead of across the tank.

Sludge Filters. Piping in the settling tanks is provided by means of which the sludge may be removed from the bottom of the sludge pit by gravity when desired. The sludge will flow through two sludge filters located adjacent to the contact filters. The area of the sludge filters is 300 square feet, which provides for a population of 900. The area should be increased to at least 800 square feet. The design of the sludge filters provides for the use of sand with an average thickness of about 20 inches.

Contact Filters. The contact filters are laid out in a rectangular plan, subdivided into three units. The walls and floors of the filters will be of concrete. The filtering material will comprise engine cinders and will have an average depth of 6 feet. The total area is 8,000 square feet or 0.184 acre, which will provide for a population or load of 2,200 per acre-foot and a rate of treatment of 217,000 gallons per acre-foot. The filters will be automatically filled and drained in sequence by the use of time siphons.

Alum Creek. Alum Creek, which will receive the effluent, has a watershed area above the point of discharge of approximately 180 square miles and a minimum dry weather flow of not over 5 cubic feet per second. It is, therefore, necessary that the plant be operated at all times, especially during periods of low flow. Below the point of discharge. Alum Creek passes between the city of Columbus and the village of Bexley, forming the dividing corporation line. The property on both sides of the stream is rapidly becoming used for residential purposes.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held February 20, 1913, these revised plans for proposed sewerage and sewage treatment plant for Sewer District No. 1, Franklin County, submitted by Messrs. Burgess and Long, consulting engineers, February 17, 1913, were approved subject to the following conditions:

1st. That the sewage treatment plant be constructed before any connections to the sewers are permitted;

2nd. That a competent official be provided by the county commissioners to supervise the sewer system and operation of the sewage treatment plant;

3rd. That samples of all filtering material be submitted to and receive the approval of the Engineer of the State Board of Health;

4th. That details of the automatic apparatus for the control of the contact filters be submitted to the State Board of Health;

5th. That the area of the sludge filters be increased to at least 800 square feet; and,

6th. That this approval shall be void unless the proposed sewers and treatment plant shall have been constructed prior to June 1, 1914.

The Board of County Commissioners and the consulting engineers were advised that a more complete displacement of flow, and therefore more efficient sedimentation would be accomplished with a direction of flow parallel to the circumference instead of across the tanks.

REPORT ON PROPOSED RELIEF SEWER FOR FREMONT.

On October 18, 1913, plans for a proposed relief sewer for Fremont were received from Mr. C. A. Hochenedel, city engineer. The plans were referred to the engineering department and on October 31, 1913, the chief engineer visited Fremont and investigated the proposed improvement. The following report was submitted:

Fremont, a city with a population of 10,000 is located in Sandusky County on the Sandusky River about thirteen miles above its discharge into Sandusky Bay. The city is provided with a public water supply obtained from the Sandusky River and has a fairly complete system of sewers constructed on the combined plan. The Sandusky River flows in a northerly direction through the central portion of the city. The principal business and residential sections are on the westerly side of the river but that portion lying to the east of the river is also a rapidly growing section.

EXISTING SEWERAGE.

The sewerage system of Fremont covers practically the entire area of the city and is constructed to remove both storm water and sewage in the same conduit. No records are available giving the number of persons tributary to the sewer system. Previous to 1904 the westerly portion of the city had been provided with sewers discharging through an outlet at a point immediately south of the Lake Erie and Western Railroad bridge, a short distance north of the central portion. At this time the easterly portion of the city had not been sewered to any great extent. Several combined sewers discharging at State, Howland, and Chestnut Streets had been installed and provided for drainage from small residential districts. In 1904 the State Board of Health approved plans for a system of combined sewers for the major portion of the city east of the river, with an outlet at the foot of Walnut Street in the extreme northeasterly portion of the city. This system of sewers was subsequently installed. In 1908 the Board approved plans for additional sewerage for the district east of the river with an outlet at the foot of Chestnut Street, adjacent to the then existing outlet. This sewerage has recently been completed.

At the present time, therefore, the sewerage from the westerly side of the river is discharged principally through an outlet located near the central portion of the city. There are in addition two storm water overflow sewers and several combined sewers draining small districts and discharging along the westerly side of the stream. The easterly side of the city is principally drained through the outlet at the foot of Walnut Street, but the other outlets at Chestnut, Howland, and State Streets are still used.

The Sandusky River, which receives the untreated sewage, has a watershed area above Fremont of some 1260 square miles and the minimum discharge of the stream at Fremont is roughly estimated at 50 cubic feet per second. During dry weather the flow is sluggish and the stage of the river in influenced by wind currents indicating that the elevation of Sandusky Bay affects the elevation of the river. At normal stages of the stream, even during dry weather, no serious nuisances are caused by the sewage discharged therein. Following extended periods of southerly wind, however, when the stage of the river is considerably reduced nuisances are caused in the vicinity of the outlets. This is, however, of rare occurrence and has caused no complaint. Based upon the assumption that the entire population of Fremont, 10,000, is connected to the sewers the estimated minimum flow of the stream furnishes a dilution of five cubic feet per second per 1,000 population. It is, therefore, probable that treatment of the sewage will be required within a few years to prevent a nuisance. Below Fremont the Sandusky River is not used as a source of public water supply although Sandusky Bay, into which the stream discharges furnishes the water supply of Sandusky. The intake at Sandusky is 30 miles by water below Fremont. The effect upon the quality of the Sandusky water supply resulting from the sewage discharged at Fremont cannot be determined until the city of Sandusky has installed a sewage treatment plant to prevent the pollution of Sandusky Bay by its own sewage.

PROPOSED RELIEF SEWER.

The sewer outlet, located on the westerly side of the river near the central portion of the city, immediately south of the Lake Erie and Western Railroad bridge, has an egg shaped section 36 inches by 54 inches. A short distance above its discharge a 42-inch circular sewer connects through a manhole. The latter sewer extends parallel to the Sandusky River and intercepts all existing sewers west of Front Street. It receives surface drainage from a considerable portion of the city and during heavy storms flows full. Its discharge into the existing outlet sewer taxes the capacity of the latter to such an extent as to dam the flow in the sewer, which results in the flooding of cellars in a considerable district tributary to the sewer. For the purpose of relieving this condition it is proposed to construct a new outlet sewer 42 inches in diameter to receive the flow from the existing 42-inch sewer on Front Street and convey it to the Sandusky River. The plans provide for the installation of a new outlet but do not contemplate the addition of any new sewers which may receive additional sewage. While an increase in the number of outlets discharging into the Sandusky River is not desirable it is evident that the installation of the proposed relief outlet will discharge at the same elevation as the existing outlet and at a point eleven feet upstream. It will, therefore, be readily connected to an intercepting sewer at such time as this may be necessary.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held December 3, 1913, these plans for a proposed relief sewer for Fremont, received from Mr. C. A. Hochenedel, city engineer, October 18, 1913, were approved subject to the following conditions:

1st. That the sewage of the city shall be collected and treated in a manner satisfactory to the State Board of Health when deemed necessary by said Board; and,

2nd. That this approval shall be void unless the proposed relief sewer shall have been installed prior to September 1, 1914.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR GALLIPOLIS.

On June 23, 1913, plans and specifications for proposed additional sewerage for Gallipolis were received from Mr. H. L. Cadot, mayor. These were referred to the engineering department and on July 8, 1913, one of the assistant engineers visited Gallipolis and investigated the proposed improvement. The following report was submitted:

Gallipolis, a city with a population of 5,600, is located in Gallia County on the Ohio River, which at this point flows in a southwesterly direction. Its water supply, installed in 1894, is obtained from shallow wells in a gravel bar in the Ohio River about one mile above the center of the city. The city is inadequately provided with sewerage facilities and a proper system of sewers is necessary.

Existing Sewerage. No adequate records of existing sewers are available. The sewers have been constructed as required and do not follow a comprehensive plan. It is known that six independent outlets have been established, five discharging into the Ohio River, and one discharging into Chickamauga Creek, a small stream which enters the Ohio in the southwesterly portion of the city. The river outlets in most cases discharge on the banks of the stream. The sewers have all been constructed on the combined plan and furnish drainage facilities for a small percentage of the area of the city. It is estimated that they serve a population of only 500, and in those portions not sewered the use of privies and cesspools is general. The necessity for an adequate system of sanitary sewers is apparent.

Proposed Additional Sewerage. The plans for proposed additional sewerage provide for the installation of sewers on Vine Street and Second Avenue in the southwesterly portion of the city. The proposed sewers will be constructed to remove storm water and domestic sewage and will comprise 1,200 feet of 15-inch pipe and 1,000 feet of 18-inch pipe. The proposed outlet is at the foot of Vine Street into the Ohio River. It is proposed to submerge the outlet below low water. Details of the outlet are not shown. The area to be drained by the proposed sewerage is 24 acres, which, at the present time, has a population of 465. The dry weather flow of sewage to be immediately tributary is estimated at 42,000 gallons per day and an additional volume of 10,000 gallons, consisting of wastes from a creamery and foundry, is expected. The sewers will be flushed by fire hose through manholes placed at the dead ends. The plans inadequately provide for future connections to the sewer, as branches are not provided at each lot.

The Ohio River at Gallipolis has a minimum flow sufficient to dilute the sewage from the city without nuisance and no treatment will be required for a number of years. The haphazard construction of sewers and location of outlets is, however, objectionable, and steps should be taken by the city to secure plans for a comprehensive system of sewers for the city with a single point of discharge where the sewage may be ultimately treated if found necessary.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, the plans for proposed additional sewerage for Gallipolis, received from Mr. H. L. Cadot, mayor, June 23, 1913, were approved subject to the following conditions:

1st. That plans for a comprehensive system of sewers for the entire city shall be prepared, adopted by the council and submitted to the State Board of Health for approval, such plans to provide for the collection of the dry weather sewage flow to one point of discharge at a location suitable for the ultimate construction of sewage treatment works;

2nd. That Y branches for connections to the proposed sewer shall be placed opposite each lot fronting the line of the sewer;

3rd. That a detail plan of the proposed outlet satisfactory to the engineer of the State Board of Health shall be submitted to the State Board of Health; and,

4th. That this approval shall be void unless (1) a plan to comply with the foregoing third condition of approval shall have been submitted prior to September 1, 1913; and (2) plans to comply with the foregoing first condition of approval shall have been submitted prior to January 1, 1914.

REPORT ON PROPOSED CHANGE OF LOCATION OF SEWAGE TREATMENT WORKS FOR GRANVILLE.

On May 12, 1913, a plan was received from The W. J. Sherman Company, consulting engineers, showing a proposed change of location of the sewage treatment works for Granville. On May 29, 1913, one of the assistant engineers visited Granville and investigated the proposed new site. The following report was submitted:

On August 15, 1912, the State Board of Health approved plans for a proposed sanitary sewer and sewage treatment works for Granville. These plans contemplated the construction of a sewage treatment plant on the so-called James tract, located in the extreme southeasterly portion of the village south of the T. & O. C. Railroad in the valley of Raccoon Creek. The site which was to have been secured has an area of 4.54 acres and is well removed from habitations. The design of the treatment works provided for sedimentation tanks, and intermittent sand filters with an effluent discharge into Raccoon Creek.

The village has been unable to secure the James tract by purchase and it is, therefore, proposed to secure another location for the plant. The so-called Jones tract, which it is proposed to utilize, lies immediately west of the James tract between the T. & O. C. Railroad and Raccoon Creek. It has an area of 5½ acres which is sufficient for the proposed treatment plant. In all respects the proposed new location is as satisfactory as the James tract, and inasmuch as its average elevation is about 2 feet higher than that of the James tract, the plant will be more suitably protected against flood destruction.

ACTION OF THE BOARD.

At a meeting held June 26, 1913, the State Board of Health considered the plans submitted by The W. J. Sherman Company, consulting engineers, May 12, 1913, showing a proposed change in the location of the sewage treatment works for Granville. The Board approved the Jones tract, so-called, shown on the plan, as a location for sewage treatment works for Granville.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR GREENFIELD.

On June 14, 1913, a general plan for proposed additional sewerage for Greenfield was received from Mr. J. L. Strang, engineer for the village. The plan was referred to the engineering department for investigation. On June 18 and 19, 1913, two of the assistant engineers visited Greenfield and made the necessary examination relative to the proposed improvement. The following report was submitted:

Greenfield, a village with a population of 4,300, is located in Highland County on Paint Creek, which stream flows in a southerly direction and is tributary to the Scioto River. The village is located on elevated ground west of the creek. The topography is rolling with the exception of a steep slope to the stream valley. The drift deposits are of glacial origin and consist of clay and gravel. The valley of Paint Creek contains gravel deposits which are waterbearing and furnish the water supply for the village. The public water supply is obtained from dug wells bordering Paint Creek, situated opposite the central portion of the village. The wells obtain their supply from the gravel deposits, being supplemented to some extent possibly by infiltration from the creek. The sewerage of the village is constructed on the separate plan, comprising three storm sewers with independent outlets, and a system of sanitary sewers with a single outlet.

Existing Sewerage. In January 1901, the State Board of Health approved of an outlet into Paint Creek for a system of sanitary sewers for Greenfield upon the condition that the sewage be purified within one year from the time that the outlet was installed. The village has failed to comply with this condition of approval. The sanitary sewerage system at present comprises five miles of sewers ranging in size from 8 to 12 inches in diameter. The sanitary sewers discharge through a single outlet into Paint Creek at a point east of the southerly portion of the village. The location of the outlet is immediately below a point where the flow of Paint Creek is diverted to a mill race. During dry weather practically the entire flow of the stream is diverted and the sewage discharged receives little dilution. The three storm sewers serve the central and southerly portions of the village. Two of them discharge into ditches tributary to the mill race mentioned, and one discharges into an abandoned quarry pit. The storm sewers have been misused to receive domestic wastes and nuisances are created at the outlets. The use of sanitary sewers has not been strictly enforced and numerous privies and cesspools remain in service within the village. It is estimated that the population tributary to the sanitary sewers is 1000. A general disregard exists for the proper use of storm and sanitary sewers.

Proposed Additional Sewerage. The general plans for proposed additional sewerage provide for the extension of the sanitary sewerage system in the extreme northerly and southerly portions of the village. For convenience these may be termed the north and south sewer districts, respectively. The village engineer has not prepared detail plans and profiles of the proposed extensions and has merely indicated the location of the additional sewers on a sewer map of the community.

The north and south districts are at present sparsely settled, although the necessity for proper sewerage facilities is felt in certain portions. The approximate area of the districts is 140 acres and 100 acres, respectively, and the ultimate population at 20 persons per acre will be 2,800 and 2,000, respectively. The additional sewage flow resulting from the construction of sewerage in the north and south districts will not appreciably increase the population of Paint Creek for a number of years.

Paint Creek. Paint Creek has a watershed area of 240 square miles. The only city of importance contributing sewage to the stream above Greenfield is Washington Court House, located 16 miles upstream with a population of 7,500. Here the sewage is discharged into Paint Creek without treatment, and an excessive pollution is caused during extreme dry weather. Below Greenfield Paint Creek flows 53 miles to its confluence with the Scioto River at Chillicothe. The nearest community below Greenfield is Bainbridge, situated 12 miles downstream. No water supply is obtained from Paint Creek below Greenfield. Based upon an estimate of .05 second foot per square mile of watershed area, the minimum dry weather flow of Paint Creek at Greenfield is 12 second feet. This is sufficient to satisfactorily dilute the sewage of 3,000 persons.

Flow measurements made June 18, 1913, indicated a discharge of 37 second feet. This undoubtedly is somewhat higher than the minimum of the stream. At this time visual observation indicated pollution of the creek at the sewer outlet. Dissolved oxygen determinations 500 feet above the sewer outlet and some 700 feet below the sewer outlet failed to indicate any important pollution of the creek. The apparent pollution in the immediate vicinity of the outlet is no doubt due to the fact that the major portion of the stream flow is diverted from Paint Creek to the mill race referred to, leaving a small volume for dilution of the sewage which is discharged below the head of the mill race. A more advantageous location of the outlet below the confluence of the race with Paint Creek would no doubt assist in securing suitable dilution of the sewage flow.

At the present time it appears that the discharge of sewage from Greenfield into Paint Creek without treatment is justified. As soon as the population tributary shall have reached 3,000, however, it will be necessary to provide a suitable plant for the treatment of the sewage to avoid a nuisance in the stream. It would be desirable to immediately extend the outlet to a suitable site for treatment works below the confluence of the mill race with Paint Creek.

Water Supply. In connection with a consideration of sewerage conditions at Greenfield, it is pertinent to note the present condition of the water supply of the village. The general use of privies and cesspools has resulted, no doubt, in a widespread pollution of subsoil water which has affected the quality of the public water supply. On several occasions since 1908 the village authorities have been advised to secure a new water supply in a more satisfactory location, but thus far have failed to follow the advice of the State Board of Health. An examination of the water supply made June 18, 1913, indicated that the supply is seriously contaminated and unfit for domestic purposes in its raw state. Shortages in the supply are experienced during dry seasons and at such times Paint Creek is depended upon as an emergency supply. It would appear that the Board should strongly urge the village to abandon its present water supply and secure a new supply of safe quality.

SUMMARY.

The village of Greenfield installed a system of sanitary sewers in 1900 and 1901 and failed to comply with the Board's condition of approval that sewage treatment works be installed within one year after the date of installation of the outlet. Additional sewerage for the north and south districts is proposed which will contribute a slight increase in the pollution of Paint Creek. The minimum dry weather flow of this stream is sufficient to dilute the sewage of 3,000 persons without nuisances and at the present time there are approximately 1000 tributary to the sewers. It would appear that while treatment works will eventually be required, it is reasonable to permit the installation of additional sewers without the immediate construction of a sewage treatment plant. An extension of the outlet to a point where the flow of Paint Creek could be more thoroughly utilized for dilution is advisable.

The water supply of the village is of unsatisfactory quality and a new supply is required. The installation of a new water supply will probably have a more beneficial effect in promoting health conditions than the installation of a sewage treatment plant. The village officials should be advised, therefore, that a new water supply should be installed at an early date.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, the general plan for proposed additional sewerage (north and south districts) for Greenfield, received from Mr. J. L. Strang, village engineer, June 14, 1913, was approved subject to the following conditions:

1st. That before a contract for the installation of the sewers is awarded detail plans for the proposed sanitary sewers for the north and south districts shall be submitted to the State Board of Health; the said plans to include location, sizes, grades, manholes, flush tanks and other accessories to the sewers;

2nd. That the existing outlet of the sanitary sewer system shall be abandoned and the outlet sewer extended to a suitable site for sewage treatment works below the confluence of Paint Creek and the Case mill race;

3rd. That the village council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, defining and requiring the proper use of sanitary and storm water sewers, and providing for the abandonment and removal of all existing improper connections to sanitary and storm water sewers;

4th. That a sewage treatment plant shall be installed when deemed necessary by the State Board of Health; and,

5th. That this approval shall be void unless the foregoing first, second and third conditions of approval shall have been complied with and the proposed additional sewerage shall have been installed prior to July 1, 1914.

The authorities were advised that the present water supply of the village of Greenfield is unsafe for domestic consumption and should be abandoned. That in taking the foregoing action, permitting the installation of additional sewerage without the immediate provision of sewage treatment works, the State Board of Health recognized the fact that in the interest of the health of the village the provision of a new water supply of satisfactory quality should precede the installation of sewage treatment works, and the Board would expect the submission of plans for a new water supply prior to December 1, 1913.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT FOR THE INTER-STATE STOCK YARDS COMPANY, TOLEDO.

On June 19, 1913, plans for proposed sewerage and sewage treatment for the Interstate Stock Yards Company, Toledo, were received from Mr. H. W. Robinson, secretary of that company. These plans were referred to the engineering department for investigation. Prior to the receipt of the plans the principal assistant engineer visited Toledo and investigated the proposed improvements. The following report was submittel:

The Interstate Stock Yards Company was organized in 1912 and during that year began the construction of a plant near the Lake Shore and Michigan Southern Railroad, about one mile southeast of Toledo. The plant is for the shipping of live stock and also for the feeding of stock in transit. The present equipment comprises a large cattle shed, a number of open air pens, and a small water works pumping station. The yards will accommodate 600 cattle and 3,500 hogs. Fifteen men are employed at the plant.

It is estimated that the water consumption is from 5,000 to 25,000 gallons per twenty-four hours and will average 10,000 gallons. This figure will approximately represent the volume of wastes produced. The wastes will comprise sewage from the offices and drainage from the shed and open air pens. As a whole the liquid will probably be high in organic matter and suspended solids. It will no doubt be highly putrescible and will create a nuisance unless suitably treated.

The sewerage will comprise a main sewer 12 inches in diameter, 1150 feet in length, and seven 6-inch lateral sewers having a total length of 1200 feet. In the line of sewer 650 feet above its outlet it is proposed to install a tank for the clarification of the sewage. The tank is of reinforced concrete construction and is covered. Its dimensions are 20 by 5 feet in plan and 4 feet in depth to the flow line, and its capacity is 3,000 gallons with a flow of 10,000 gallons per twenty-four hours. The period of retention provided is 7 1/3 hours. The sludge capacity of the tank is inadequate in view of the high content of suspended matter in the sewage. No facilities are shown for removing the solid matter from the tank and properly disposing of it. The floor of the tank should be properly sloped to the inlet end, a drain leading to the sludge well installed and pumping equipment provided for lifting the sludge from the well. The clarified effluent from the tank will be conveyed to a small ditch tributary to Otter creek, which enters the Maumee River near its discharge into the Maumee Bay. During dry weather the flow in the ditch is nil and at such times a nuisance may result from the discharge of the tank effluent. Secondary treatment of the wastes may be required at a later date.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, plans for sewerage and sewage treatment for the Interstate Stock Yards Company, Toledo, received June 19, 1913, from Mr. H. W. Robinson, secretary of the company, were approved subject to the following conditions:

1st. That the design of the proposed septic tank shall be revised in a manner satisfactory to the engineer of the State Board of Health by providing proper facilities for the removal and disposal of sludge;

2nd. That devices for secondary treatment of the sewage shall be installed when deemed necessary by the State Board of Health; and,

3rd. That this approval shall be void unless the proposed sewerage and sewage treatment plant (satisfactorily revised) shall have been installed prior to November 1, 1913.

REPORT ON PROPOSED SEWAGE TREATMENT PLANT FOR MR. A. I. BATES AT IRVINGTON, NEAR DAYTON.

On October 8. 1913, Mr. Gustave A. Niehus, architect, submitted plans for a sewage treatment plant for the residence of Mr. A. I. Bates, at Irvington, near Dayton.

On November 11, 1913, one of the assistant engineers visited Dayton for the purpose of inspecting the site for the proposed sewage treatment plant. The following report was submitted:

The residence for which the proposed treatment plant is designed is in the course of construction on a newly platted subdivision, at a traction stop called Irvington, seven miles north of Dayton along the Covington Pike. There is electric power but no public water supply or sewerage. There are no other houses in the immediate vicinity at the present time; the nearest habitations are 800 to 1000 feet away. The lot on which the house is located is approximately 70 feet by 150 feet. The water supply for the residence will be obtained from a driven well in the northeast corner of the house. This well is driven 32 feet below the level of the cellar floor and is cased with a 6-inch casing all of the way down. Water was encountered at 28 feet and the supply is derived from the next 4 feet of sand and gravel. The water rises in the well by artesian pressure to a point 18 feet below the cellar floor, entering the well from the bottom. There is no strainer. Water will be pumped by an electric motor to a pneumatic tank from which it will be distributed through modern plumbing fixtures in the house and garage.

Water supplies for houses to be built in this district in the future will probably have to come from private wells.

Probable Quality and Quantity of Sewage. The plant will serve at a maximum four persons and will receive an estimated daily flow of 60 to 100 gallons of sewage. There will be the following fixtures from which water may enter the plant:

1 bath tub.
1 water closet.
1 lavatory.
1 kitchen sink.
2 16″ by 16″ by 10″ sinks in garage.
1 stationary laundry tub.
2 garage floor drains.

The sewage will probably be of a fairly strong domestic character, with a good portion of oil and grit from the automobile washings in the garage.

Surroundings. Though all the land in the vicinity of this lot has been subdivided, this is the only house at present within a radius of 800 to 1000 feet. The house faces on a road in front and has an alley at the side and back. The septic tank will be about 24 feet at its west-most extremity from the well and the absorption tile will be over 44 feet east of said well. It is proposed to extend the absorption tile to within a foot of the lot line on the north and within 2½ feet of the alley line on the east. The entire absorption area will be north of the north side of the garage, which is 19½ feet south of the north lot line.

PROPOSED PLANT.

The proposed plant is to be composed of a septic tank dosing chamber and absorption system of drain tile for subsurface irrigation. It is proposed to locate the disposal plant on the northeast portion of Mr. Bates' lot, which is approximately 150 feet by 70 feet. The surface of the ground slopes gently to the northeast to the Stillwater River, about ½ mile away. The greatest grade in the vicinity of the house is from 2.5 to 3 per cent. The subsoil is clayey in character down to a depth of about 7 feet. A test pit was dug as shown in the plat just back of the location for the garage, and showed about 30 inches of fine black surface soil, 1 foot of mixed black and yellow clay and about 2 feet more of yellow clay in which there was a small quantity of sand and gravel. The architect stated that this stratum of a yellow clay was about 4 feet thick and underlaid with sand, shown by the excavations for the foundation of the house and yard. Ground water is found 28 feet below the bottom of the cellar of the house, which is approximately at the same level as the surface of the ground at the site of the proposed disposal field. This elevation was determined by the point at which water was struck in the well underneath the northeast corner of the house. This water bearing strata is sandy in character.

The septic tank and dosing chamber are combined and are designed to have 4-inch floors, 6-inch concrete walls and 4-inch reinforced covers. Near the inlet of the septic tank and the outlet of the dosing chamber are located manholes, 18 inches in diameter, closed with cast iron cistern covers.

The internal dimensions of the septic tanks are 11 feet 9 inches by 2 feet 9 inches in plan and 5 feet 9 inches in depth with the flow line 4 feet 9 inches from the bottom. Thus the capacity of the tank would be 1145 gallons, which is equivalent to a 10 to 12 day flow with an average flow of about 100 gallons. This flow period will undoubtedly be shortened at times when large quantities of water are being used, for instance on wash days and when the automobile is being washed. Deposits of sludge and detritus will also decrease this period. It was suggested to the architect that the brick baffle wall which is placed in the center of the tank with two 12-inch openings at the bottom be omitted, and that in place of this wall two wood hanging baffles be used, one near the outlet and one near the inlet, and reaching .6 of the distance from the top to the bottom of the tank. It was also suggested to slope the floor toward the inlet end. A sump with valve and drain under this end would be very convenient in cleaning, but the topography of the country and the great distance to which the drain would have to be carried makes such an arrangement almost prohibitive.

The inlet and outlet to the septic tank are similar. At the inlet the 4-inch vitrified sewer tile is joined to a cast iron T 4 inches by 4 inches by 4 inches from which the 4-inch pipe rises to above the ground for a vent, and from the other leg of which there is a discharge pipe with its open end about 1 foot below the flow line. The outlet is exactly the same as the inlet with the exception that there is an iron pipe instead of the sewer pipe joined to the T to carry the settled sewage from the septic tank to the dosing chamber.

The internal dimensions of the dosing chamber are 6 feet 3 inches in length, 2 feet 9 inches in width and 2 feet 1½ inches to 2 feet 4 inches in depth. The flow line is 1 foot below the top of the tank and there is about 1 foot of effective depth from this flow line to the sniff hole in the siphon. The effective capacity of the dosing chamber is 129 gallons, which is equivalent to a little under 1-1/3 days flow. The absorption tile would thus be dosed about three times in every four days. A 3-inch siphon is provided and it was suggested to the architect that the vent of the siphon be placed outside the dosing chamber and brought above the ground, similar to the vents in the inlet and outlet of the septic tank.

The proposed system of absorption tile consists of one central vitrified tile outlet drain with branches of 9 foot lengths of 4-inch agricultural draining tile at right angles to the central drain, 3 feet center to center. Owing to the fact that this layout would have a tendency to unever distribution due to the rushing of the water past the first few branches, it was suggested that the layout be changed to a fork system. The capacity of the absorption tile will be 176 gallons or 136 percent of the effective capacity of the dosing chamber. The tile will be laid level with the invert 3 feet 6 inches from the surface of the ground at the head of the cistern. This will bring the tile at the lower end not over 2½ feet below the ground. They are to be laid in gravel. It is proposed to dig out the surface soil to a depth slightly greater than that at which the tile are to be placed, place the tile on gravel, fill in with gravel to a depth of a foot or more, and then recover with soil. With either the present or suggested layout there is no provision made for underdraining the bed; the great distance to the Stillwater River, the absence of any small creeks nearby and the fact that all the surrounding country has been subdivided into city lots would make underdraining and a sewer a very expensive proposition.

If intermittent sand filters were to be used in place of the absorption system it would require, assuming a rate of 100,000 gallons per acre per day, 43.56 square feet of superficial area to take care of the flow of 100 gallons per day. This area would be furnished by two beds, 4 feet by 5½ feet in plan. The effluent from these beds, however, would have to be disposed of; and, unless carried to the Stillwater River, it would have to be absorbed in the previous sand which underlies the clay. This very probably would, in time, pollute the ground water from which the drinking water from this house and probably others which will be built in the vicinity will be taken.

SUMMARY.

It is proposed to build a sewage treatment plant consisting of a septic tank, dosing chamber, and absorption system in a lot 150 feet by 70 feet. A private well has been drilled in this same lot 24 feet from the septic tank and 44 feet from the tile absorption system. The absorption system is to be located in a clayey soil and to be immediately surrounded by coarse gravel. No underdrain is to be provided.

ACTION.

Under date of November 14, 1913, the Secretary of the State Board of Health, after reviewing plans for a proposed sewage treatment plant for the residence of Mr. A. I. Bates, at Irvington, near Dayton, received from Mr. Gustave A. Niehus, architect, October 8, 1913, disapproved the same.

Mr. Bates was advised that it would be unsafe to utilize any system of sewage disposal upon his property on account of the likelihood of the water supply obtained from the well 32 feet deep being polluted; and that either a watertight cesspool with no outlet, or a privy constructed in accordance with the Ohio Building Code, should be used.

REPORT ON PROPOSED SEWAGE TREATMENT PLANT FOR LAKESIDE.

On February 13, 1913, plans and specifications prepared by Mr. R. Winthrop Pratt, consulting engineer, for a proposed sewage treatment plant for Lakeside, were received from Mr. A. B. Jones, superintendent of the Lakeside Campmeeting Association. The plans were examined in the engineering department and the following report submitted:

Lakeside is a summer resort, located in Ottawa County on the shore of Lake Erie. While the permanent population is approximately 100, the population during July and August reaches 3,500 or more, owing to the habitation of some 600 summer cottages. The community is provided with a public water supply which is obtained from Lake Erie and purified by the use of a rapid sand filter plant. The community is also provided with an incomplete system of sanitary sewers which are available to only a portion of the cottages. The sewers are improperly constructed, being laid near the surface of the ground without constant grades, proper alignment or manholes. The sewage is all discharged through a crude settling tank and a 6-inch cast iron submerged outlet extending some 150 feet into Lake Erie. At the present time the sewers are used to a limited extent owing to the fact that few of the cottages are provided with modern plumbing conveniences. It is probable, however, that within a few years the sewer system will be improved and extended to make possible a more general use of inside plumbing accessories.

The necessity of proper disposal of the sewage from Lakeside has been urged upon the authorities by the State Board of Health for a number of years. The water supply intake is taken from a point not more than 100 feet from the shore and 2,400 feet east of the present sewer outlet. It is, therefore, advisable that precautions be taken to secure reasonable treatment of the sewage before it is discharged into the lake. The existing installation has failed to accomplish satisfactory treatment and the effluent has caused shore nuisances, making the use of the lake for bathing a dangerous recreation.

Proposed Sewage Treatment Plant. The plans of the consulting engineer provide for the removal of the existing installation and the construction of a tank with separate sedimentation and sludge compartments and a new submerged outlet. Before reaching the tank the sewage will pass through a coarse screen and at the outlet of the tank the settled sewage will pass through the treatment chamber where it will be disinfected by the use of calcium hypochlorite. The installation is for the treatment of 75,000 gallons of sewage per day contributed by 2,500 persons.

The screen chamber will contain a bar screen with open spaces of one inch which will remove the coarser suspended particles from the sewage. From the screen chamber the sewage will enter the settling compartments of the tank. The suspended matters will pass into the sludge compartment below, through slots in a false bottom and the settled effluent will pass to the treatment chamber. The tank will be entirely of concrete construction and will have total inside dimensions of 32 by 20 feet. It will be covered by a concrete roof which will in turn be covered over with earth. The settling compartments are placed parallel, extending longitudinally through the tank. The total length of flow is 64 feet and the total sedimentation capacity is 19,000 gallons providing 5 to 6 hours retention of the sewage. One or both of the sedimentation compartments may be utilized according to the sewage flow. The sludge compartment has a capacity of 840 cubic feet, providing 63 days retention of the sludge on a basis of 2,500 persons tributary to the sewers. This will provide for the removal of the sludge at the end of each season. The settled effluent will receive hypochlorite treatment at its entrance into the treatment tank. This is a cross baffled tank with a capacity of 675 gallons, furnishing 10 to 15 minutes retention. The hypochlorite will be applied from two solution tanks of 275 gallons each through a constant head orifice tank. A neat housing will extend over the hypochlorite tanks and screen chamber. The disinfected effluent will be discharged through an 8-inch wrought iron pipe to extend 500 feet from the shore of the lake and submerged.

The sludge from the settling tank will be removed from the sludge compartment by pumping it into the treatment tank. At this point it will be diluted with water, disinfected with hypochlorite and discharged through the effluent line into the lake. At the time of cleaning the water supply will not be used as it is proposed to remove the sludge from the tank only after the close of the summer season.

ACTION OF THE BOARD.

At a meeting held February 20, 1913, the State Board of Health approved the plans and specifications for a proposed sewage treatment plant at Lakeside, prepared by Mr. R. Winthrop Pratt, consulting engineer, and received from Mr. A. B. Jones, superintendent of the Lakeside Campmeeting Association, February 13, 1913, subject to the following conditions:

1st. That a competent operator be placed in charge of the plant;

2nd. That the sludge be removed from the tank only after the close of the summer season after the operation of the water purification plant has terminated;

3rd. That the plant be altered, repaired, or enlarged whenever alterations, repairs, or enlargements are deemed necessary by the State Board of Health; and,

4th. That this approval shall be void unless the plant shall have been installed prior to June 1, 1913.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR LIMA.

On March 29, 1913, a request for approval of additional sewerage for Lima, to be constructed on Atlantic Avenue at private expense, was received from Mr. B. Huber, a citizen of Lima. The request was accompanied by a resolution of the city of Lima granting permission for the construction of the sewer. The request was referred to the engineering department and the following report was submitted:

Lima, a city with a population in 1910 of about 30,000, is provided with a system of combined sewers which are inadequate to properly care for the storm water flow of the city. The sewerage system has been constructed at various times without following any comprehensive plan. As a result numerous outlets have been established into the Ottawa River, which stream receives the drainage from the entire city. There are at the present time 41 independent sewer outlets ranging in size from 12 to 60 inches which discharge into the river at intervals along its course through the city. The two largest sewers, namely, the Watt Town and Timber Lake sewers, 36 and 60 inches in diameter, respectively, discharge near the southwestern portion of the city.

The watershed area of Ottawa River above Lima is about 110 square miles and the minimum dry weather flow of the stream does not exceed 4 cubic feet per second. Its flow, it will be seen, is entirely inadequate to dilute the sewage of the city sufficiently to prevent a creation of a decided nuisance. As a result Ottawa River below Lima is one of the most offensively polluted streams in the state. Conditions within the city have been improved by the construction of a channel in the rock bottom of the river which provides for a more rapid flow of the offensive water of the stream. It, however, tends to produce more offensive conditions below the city.

Proposed Additional Sewerage. It is proposed by the property owners to construct at their expense a 12-inch vitrified pipe sewer, about 800 feet in length, in Atlantic Avenue from Ottawa Street north to the Ottawa River. At the present time there are 32 outlets above Atlantic Avenue and 9 outlets below Atlantic Avenue. It will be seen, therefore, that the effect of the additional sewage will not be detrimental to the stream. The proposed sewer will furnish drainage for three houses at the present time, with an ultimate number of 17. The population would be estimated at from 15 to 85, respectively.

Previous Actions of the State Board of Health. In 1900 the State Board of Health approved plans for the Timber Lake, Watt Town and Askins sewers subject to the condition that all sewage discharged into the Ottawa River should be purified in a manner satisfactory to the State Board of Health before the proposed sewers were placed in use.

The condition of approval was ignored and the sewers were constructed and have been used in disregard of the action of the State Board of Health. On August 8, 1911, a complaint under the Bense Act was received from Mr. C. A. Rusler, clerk of Shawnee Township, requesting an investigation of the pollution of the Ottawa River by the sewage of Lima. Subsequently, the Board acted upon this complaint while the Bense Act was in litigation and owing to the invalidity of the act at that time found it advisable to require compliance with the condition of approval of the Timber Lake, Watt Town, and Askins sewers, instead of attempting to pursue the complaint under the Bense Act. The Board required that the city submit prior to March 1, 1912, plans for sewage treatment works and that the installation of sewage treatment works be begun not later than July 1, 1912. This action of the Board has not been complied with.

SUMMARY.

From the foregoing report it will be noted that the city of Lima is at the present time seriously polluting the Ottawa River with sewage discharged therein. The city has failed to comply with the Board's requirements relative to the treatment of the sewage. The additional sewage which will be contributed by the proposed sewer will not increase the apparent pollution of Ottawa River, but in view of the previous actions of the State Board of Health designed to bring about an improvement in the condition of the stream, and also in view of the laxity of the city officials to comply with the directions of the Board, it would seem ill-advised to permit the installation of additional sewers discharging into Ottawa River.

ACTION OF THE BOARD.

At a meeting held May 22, 1913, the State Board of Health disapproved proposed additional sewerage for Lima, to be constructed on Atlantic Avenue at private expense, according to a request received from Mr. B. Huber, March 29, 1913.

The mayor and council were notified that the Board would not permit of the installation of additional sewers discharging into the Ottawa River until provision had been made for the proper disposal of the sewage of the entire city.

REPORT ON PROPOSED STORM SEWERAGE FOR DISTRICT C, LORAIN.

On April 2, 1913, plans for proposed storm sewerage for District C, Lorain, were received from Mr. C. M. Osborn, city engineer. The plans were referred to the engineering department and the following report was submitted:

Lorain is located in Lorain County at the mouth of the Black River on the shore of Lake Erie. The population at the present time is approximately 33,000, and the city is undergoing a flourishing growth. As is true of that portion of the state bordering Lake Erie, the topography of Lorain and vicinity is flat. The drainage from Lorain reaches Lake Erie and the Black River which passes through the central portion of the city.

The city is provided with a water supply obtained from Lake Erie through an intake located about 2,800 feet from the shore and about 2,000 feet west of the mouth of the Black River. A Government breakwater extends into the Lake west of the mouth of the Black River affording some protection to the quality of the water at the intake. The water supply is purified by treatment in a rapid sand filter plant which has been shown to be efficient by numerous examinations made by the State Board of Health. The city is also well sewered, the separate system being followed in all but one of the districts. Storm sewers discharge at convenient points into the Black River and into Lake Erie through some seven outlets. The sanitary sewers have been designed to make possible the ultimate collection of the entire flow to one or two outlets. At the present time there are four sanitary sewer outlets into the Black River and one outlet into Lake Erie. As has been stated the water supply is fairly well protected from contamination by the waters from the Black River by the construction of Government breakwater which deflects the flow of the river past the intake and into the lake. Black River has a watershed area of 468 square miles and a minimum dry weather flow of approximately 15 cubic feet per second, sufficient to dilute the sewage of about 5,000 persons. It will be seen that the necessity will soon arise for improvement in the disposal of the sewage now discharging into the Black River.

Proposed Storm Sewerage. District C, for which the sewers are designed, is located in the extreme easterly section of the city and drains naturally to Lake Erie through a small watercourse. The district has an area of 605 acres, of which the sewers to be installed immediately will drain 116 acres. This area represents that portion of the district which has been developed for residential purposes and which is now populated by about 600 persons. The sewage from this population is at present cared for by sanitary sewers, forming a part of the system of sanitary sewer district No. 3. With proper supervision, therefore, a system of storm sewers should not be misused for sanitary drainage.

The design provides for the installation of 1.84 miles of sewers, varying in diameter from 12 inches to 72 inches. The system is designed to carry 128,000,000 gallons per 24 hours, or 198 cubic feet per second, which is the assumed maximum runoff from the area to be drained ultimately, 605 acres. The outlet for the proposed system will be located on the shore of Lake Erie at a point 1.5 miles east of the water works intake and about one mile east of the mouth of the Black River. It should be noted that the entire flow from the sanitary sewers east of the Black River is discharged at a point one-half mile east of the proposed outlet.

The use of the sewers should be restricted to storm water only. In the immediate future no necessity for the removal of other waste is likely to arise but with the developement of manufacturing industries within the district there may be a desire to utilize the sewers for the removal of manufacturing wastes. The presence of sanitary sewers will probably prevent the misuse of the storm sewers for domestic sewage.

SUMMARY.

The plans of the city engineer for proposed storm sewerage for Sewer District C, Lorain, will provide adequate drainage for the district. The point of outlet into Lake Erie is suitable and no effect upon the quality of the water in the lake, or upon the water supply of the city, will result from the discharge of the storm water. It is important to regulate the use of the proposed system of storm sewers and to this end an ordinance should be passed by the city council designating the proper use of the sanitary and storm water sewers within the city.

ACTION OF THE BOARD.

At a meeting held May 22, 1913, the State Board of Health approved plans for proposed storm sewerage for District C, Lorain, received from Mr. C. M. Osborn, city engineer, April 2, 1913, subject to the following conditions:

1st. That the city council pass an ordinance defining the proper use of the proposed system of storm sewerage and of all sanitary, combined, and storm sewers existing or constructed in the future; and that a copy of the said ordinance be submitted to the Secretary of the State Board of Health for approval prior to its passage;

2nd. That this approval shall be void unless the aforesaid ordinance shall have been passed and the proposed system of storm sewers or the main sewer thereof installed prior to July 1, 1914.

REPORTS ON PROPOSED STORM SEWERS FOR RUGBY PLACE, MAIN SEWER DISTRICT NO. 1, LUCAS COUNTY.

On August 14, 1913, Mr. Charles J. Sanzenbacher, Clerk of the Board of County Commissioners of Lucas County, transmitted a resolution of the commissioners granting permission to The Realty Trust Company of Toledo for the construction of, at its expense, a system of storm sewers for Rugby Place in Main Sewer District No. 1, Lucas County. On August 22, 1913, a general plan for the proposed sewers was received from Mr. W. H. Gould, county sanitary engineer. The resolution and plan were referred to the engineering department, and on October 7, 1913, the chief engineer visited Toledo and investigated the proposed improvements. The following report was submitted:

Rugby Place is a real estate allotment, owned by The Realty Trust Company of Toledo having an area of 55 acres, and located about 1.5 miles southwest of the city of Toledo and about ½ mile northwest of the Maumee River. It is entirely included in Main Sewer District No. 1 of Lucas County.

At the present time Rugby Place is unoccupied but it is expected that within two years the population will reach one hundred. Sanitary sewerage has been planned for Rugby Place in connection with a general system of sewers for Main Sewer District No. 1, plans for which were submitted to the State Board of Health November 10, 1911.

For the purpose of securing drainage of the surface and soil to a depth of a few feet, it is proposed to install a system of storm water sewers extending along the streets of the real estate allotment. These sewers will be constructed of 8-inch, 10-inch, and 12-inch vitrified pipe and will have a total length of 4,350 feet. The sewers will be placed at an average depth of 5½ feet below the surface. The pipe will be laid with open joints to allow the entrance of subsoil water and nine catch basins, located at convenient points, will permit the drainage of the surface. The capacity of the system is 3.2 cubic feet per second, which provides for 33 per cent runoff from the area to be drained. The main outfall sewer will be connected to an existing county storm water sewer which extends a few hundred feet west to an outlet into a branch of Delaware Creek. Below the point of outlet Delaware Creek flows about two miles to its confluence with the Maumee River. Above the sewer outlet the stream has a watershed area of less than one square mile and the flow is intermittent. Any misuse of the proposed storm water sewers would, therefore, result in a decided nuisance.

ACTION OF THE BOARD.

At a meeting held October 15, 1913, the State Board of Health approved the plans for proposed storm sewers for Rugby Place, Main Sewer District No. 1, Lucas County, received from Mr. Wm. H. Gould, county sanitary engineer, August 14, 1913, subject to the following conditions:

1st. That the Board of County Commissioners of Lucas County shall control the establishment of connections to the proposed sewers and shall adopt and submit to the State Board of Health regulations to provide proper use of the sanitary and storm water sewers, and that the proposed sewers shall not be used to remove sewage or other objectionable wastes; and,

2nd. That this approval shall be void unless the aforesaid regulations shall have been adopted and submitted to the State Board of Health prior to January 1, 1914.

REPORT ON PROPOSED SEWERAGE FOR MAIN SEWAGE DISTRICT NO. 2, LUCAS COUNTY.

On October 23, 1913, a general plan for proposed sewerage for Main Sewer District No. 2, Lucas County, was received from Mr. Wm. H. Gould, county sanitary engineer. The plan was referred to the engineering department for examination. Prior to the submission of the plan the Chief Engineer visited Toledo on October 7, 1913, and investigated the proposed improvement. The following report was submitted:

Main Sewer District No. 2, Lucas County, is located immediately north of Ten Mile Creek which forms the northerly corporation line of the city of Toledo. The district, as established by the county commissioners, has a total area of 1,770 acres and a present population of approximately 2,000. Almost the entire population of the district is contained in the unincorporated community of West Toledo, which covers an area of approximately 700 acres bordering Ten Mile Creek. The natural drainage from the southerly portion of the district reaches that stream. The northerly portion of the district is drained by Sibley Creek, which flows through the district in an easterly direction and is tributary to Ten Mile Creek.

The present sewerage facilities of the district are inadequate. The county has constructed several storm water sewers for street drainage which sewers have become misused for the removal of objectionable wastes. A number of short sewers have also been built through private enterprise and discharge at convenient points into Sibley and Ten Mile Creeks. Within the district are a number of industries devoted to rendering, packing and other processes producing objectionable liquid wastes. As a result of the discharge of domestic and manufacturing wastes into the streams, Ten Mile Creek and Sibley Creek are seriously polluted. The effect upon the former stream is largely obscured by the excessive pollution caused by the sewage from Toledo.

Recognizing the insanitary conditions existing in West Toledo the State Board of Health in December 1912 declared the necessity for sewerage for Main Sewer District No. 2, previously established by the county commissioners, and requested that the necessary plans and specifications be prepared and submitted to the Board.

Proposed Sewerage. The general plan of proposed sewerage provides for the installation of a system of sanitary sewers to drain the area covered by West Toledo, which system will be ultimately extended to serve the entire district. The system is designed to serve a future population of 75,000, equivalent to 42 per acre, and to carry a maximum daily sewage flow of 7.5 million gallons. Of this flow, it is estimated that 90,000 gallons will comprise wastes from industrial plants. The sewers are designed in accordance with good engineering practice and are adequate to remove the sewage which will be produced within the district. The system will comprise the following lengths of vitrified sewer pipe:

Diameter	*Length*
8 inch	35,240
10 inch	6,130
12 inch	6,200
15 inch	17,900
18 inch	4,580
24 inch	3,690
30 inch	1,120
33 inch	585

The sewage flow from the entire system will be collected at a single point of outlet into Ten Mile Creek in the southeasterly portion of the district. Although the plans contain no provision for sewage treatment works, it is stated in a communication, accompanying the general plan of sewerage, that designs are in progress for the treatment of the sewage. Tentatively, the treatment plant will comprise two-story settling tanks and double contact filters, the effluent from which will be discharged into Ten Mile Creek. The site contemplated for the plant is a tract with an area of approximately four acres, bounded by Castener Street, Catawba Street, Phillips Avenue, and Ten Mile Creek. Its location is somewhat objectionable due to the proximity of residences north of the site.

Ten Mile Creek has a watershed above the proposed outlet of approximately 125 square miles. Below the outlet the stream flows a distance of six miles to its discharge into Maumee Bay. Slack water extends upstream to a point above the proposed outlet and the elevation of the creek fluctuates with that of Lake Erie. There results at times an upstream velocity. Ten Mile Creek is seriously polluted by the sewage from Toledo and the city is now engaged in studies which will lead to a correction of the present conditions. An order of the State Board of Health issued August 25, 1913, requires that the improvement shall be completed prior to August 25, 1915. Although no definite plans have been determined upon it is probable that Ten Mile Creek problem will be solved by the construction of intercepting sewers discharging through sedimentation tanks into a pump well on the bank of the creek almost opposite the proposed outlet for Main Sewer District No. 2. From this point the settled sewage will probably be pumped to a temporary outlet into the Maumee River. With the accomplishment of this plan the dry weather flow of sewage will be entirely removed from the creek. In view of the contemplated improvements to be made by the city of Toledo, it appears unwise to permit the establishment of a sewage treatment plant for Main Sewer District No. 2, and preferably a connection should be made whereby the untreated sewage or settled sewage from the district could be collected with the flow from the city sewers and disposed of in the same manner.

The insanitary conditions within Main Sewer District No. 2 demand the installation of a satisfactory system of sewers. It is the desire of the county commissioners to proceed with the construction of sewers at an early date and to determine the question of disposal prior to the completion of the system. It would appear that the Board is justified in permitting the construction of the sewers in advance of the preparation of plans for treatment or disposal.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the general plan for proposed sewerage for Main Sewer District No. 2, Lucas County, received from Mr. Wm. H. Gould, county sanitary engineer, October 23, 1913, subject to the following conditions:

1st. That before connections to the proposed system of sewers are permitted a process of treatment or disposal of the sewage, satisfactory to the State Board of Health, shall be provided; and,

2nd. That this approval shall be void unless plans for treatment or disposal of the sewage shall have been submitted prior to June 1, 1914.

The Board withheld approval of the contemplated plan of treatment of the sewage by tanks and contact filters at the site shown on the general plans of proposed sewerage, and advised a connection with the contemplated intercepting sewer, treatment plant, or pumping station of the Ten Mile Creek sewer district of the city of Toledo for the disposal of the crude or clarified sewage from Main Sewer District No. 2.

REPORT ON EXTENSION OF APPROVAL OF PROPOSED LOCAL SANITARY SEWER NO. 1, MAIN SEWER DISTRICT NO. 2, IN GRADOLPH AVENUE, WEST TOLEDO.

On February 24, 1913, a communication was received from Mr. William H. Gould, sanitary engineer for Lucas County, requesting that the Board revise its first condition of approval of proposed Local Sanitary Sewer No. 1, Main Sewer District No. 2, in Gradolph Avenue, West Toledo, granted December 12, 1912, by extending the time set for the submission of plans for the main sewer and sewage treatment works in Main Sewer District No. 2. This request was referred to the engineering department and the following report was submitted:

The pollution of Sibley Creek by wastes discharged into it at West Toledo was investigated by a committee of the Board June 29, 1912. It was found that an extreme nuisance was caused and it was pointed out that the conditions could be improved by constructing a main sewer. In August 1912 the State Board of Health adopted a resolution declaring the necessity of a main sewer in Main Sewer District No. 2, Lucas County. In December 1912 the State Board of Health approved of plans and specifications for proposed Local Sanitary Sewer No. 1, Main Sewer District No. 2 in Gradolph Avenue, West Toledo, providing that plans and specifications for a main sewer or sewers and sewage treatment works in Main Sewer District No. 2 be submitted prior to April 1, 1913.

Main Sewer District No. 2, includes an extensive residential district as well as numerous industries which produce liquid wastes. The streams Sibley Creek and Ten Mile Creek, north and south, respectively, of West Toledo, receive considerable pollution and it is necessary that immediate steps be taken to properly collect and treat the domestic and industrial wastes.

On February 21, 1913, the board of county commissioners of Lucas County directed their sanitary engineer to prepare the plans for sewerage in Sewer District No. 2, but owing to the magnitude of the problem involved in the design of the sewers and sewage treatment works, it will be impossible to prepare plans by April 1, 1913, the time set by the State Board of Health. It is desired to investigate thoroughly the quantity and character of industrial wastes in order to arrive at a suitable design of sewers and treatment works.

ACTION OF THE BOARD.

At a meeting held March 20, 1913, the State Board of Health considered a request received from Mr. Wm. H. Gould, February 24, 1913, for an extension of the time set for the submission of plans for the main sewer and sewage treatment works in Main Sewer District No. 2, Lucas County.

The Secretary was instructed to notify the county commissioners that the Board voted to revise the first condition of its approval of a proposed Local Sanitary Sewer No. 1, Main Sewer District No. 2, in Gradolph Avenue, West Toledo, granted December 12, 1912, to read as follows:

1st. That the board of county commissioners of Lucas County have prepared and submitted to the State Board of Health prior to January 1, 1914, plans and specifications for a main sewer or sewers and sewage treatment works in Main Sewer District No. 2, Lucas County, the necessity for which was declared in a resolution adopted by the State Board of Health August 15, 1912.

On May 22, 1913, a resolution of the board of county commissioners of Lucas County was received, requesting that the time for the installation of Local Sanitary Sewer No. 1, Main Sewer District No. 2, be extended to August 1, 1913.

ACTION OF THE BOARD.

At a meeting held May 22, 1913, the State Board of Health considered this resolution.

The Secretary was instructed to notify the county commissioners that the Board voted to revise the second condition of its approval of a Local Sanitary Sewer No. 1, Main Sewer District No. 2, in Gradolph Avenue, West Toledo, granted December 12, 1912, to read as follows:

2nd. That this approval shall be void unless the proposed sewer shall have been installed prior to August 1, 1913.

REPORT ON NECESSITY FOR SANITARY SEWERAGE FOR MAIN SEWER DISTRICT NO. 3, LUCAS COUNTY.

On December 11, 1912, there was received from Mr. Wm. H. Gould of Toledo, county sanitary engineer, a plan of proposed main sewer district No. 3, Lucas County, and a resolution adopted by the county commissioners of Lucas County of which the following is an excerpt:

"*Resolved*, By the Board of County Commissioners of Lucas County, Ohio, that pursuant to the provisions of Section 1 of an act of the General Assembly of the State of Ohio, passed May 31,1911, approved June 8th, 1911, and entitled, 'An act authorizing the board of county commissioners of the several counties of the state to provide for the construction of sewers outside of the municipalities and to provide for the payment of the cost and expense thereof,'—the lots and lands in that part of Town 3, United States Reserve of 12 miles square at the foot of the Rapids of the Miami of Lake Erie, in Lucas County, Ohio, lying and being within the following described boundaries, to-wit:

Beginning at the point where the North line of River Tract 16 intersects the Northwest shore of the Maumee River, thence Westerly along said North line of River Tract 16 to the center-line of the Miami and Erie Canal; thence Southwesterly along said center-line of the Miami and Erie Canal to its intersection with the East and West Center-line of River Tract 16; thence Westerly along said East and West center-line of River Tract 16 to the center of the Monroe Turnpike (Detroit Avenue, so-called); thence North-easterly along the center-line of the Monroe Turnpike (Detroit Avenue, so-called) to the center of Glendale Avenue; thence Easterly along the center-line of Glendale Avenue to the East line of Section 16; thence Southerly along the East line of Section 16 to the North-west shore of the Maumee River; thence Southwesterly along the North-westerly shore of the Maumee River to the place of beginning,—

be, and the same are hereby ordered laid out and established as a sewer district, the same to be known and designated as 'Lucas County, Ohio, Main Sewer District No. 3.' "

On December 17, 1912, Dr. Oscar Hasencamp, president of the Board, and Mr. W. H. Dittoe, chief engineer, a committee appointed to investigate the necessity of sewerage for the district, inspected the territory embraced in the proposed main sewer district No. 3 and the following report was submitted:

The proposed main sewer district No. 3 embraces a territory of about 467 acres lying northwest of the Maumee River and immediately south of the southerly corporation line of the city of Toledo. Immediately south of the proposed district, main sewer district No. 1, Lucas County is located. The necessity for sewerage for this district was declared by the State Board of Health in August, 1911. The water works intake for the Toledo water purification plant is immediately south of the southerly boundary of proposed main sewer district No. 3, but as this is in an upstream direction from the district, the quality of the raw water can be influenced by the sewage from the district only under conditions which will reverse the current of the river.

Delaware Creek, a small stream with a watershed area of 2.7 square miles, flows in an easterly direction through the district and sub-divides it into two main drainage areas. The Miami and Erie Canal passes in a northerly and southerly direction through the district and further subdivides the district into four natural drainage areas. It is intended in laying out sewerage for the district to follow the natural sub-division by the installation of four independent sewer systems leading to a central point for disposal. For the purpose of convenience the sub-districts have been designated as Nos. 1, 2, 3 and 4.

Sub-district No. 1 at the present time is built up to some extent containing perhaps fifty residences. Some of these are already provided with sewerage facilities by private lines discharging directly into the river. These outlets constitute a menace to the water supply of the city and have been ordered abandoned by the director of public service. It is unnecessary to state that a complete system of sewers for this sub-district is required.

Sub-district No. 2 is at the present time very sparsely populated and is largely farm territory. Sewerage, therefore, is at the present time unnecessary. Sub-district No. 3 is also sparsely populated, but is likely to become built up within the next five years. Anticipating its growth, therefore, sewerage for this sub-district is required. Sub-district No. 4 is at the present time built up in its easterly portion, and this section is provided with sewerage with an outlet into the existing city sewers. The westerly section of sub-district No. 4 will no doubt experience a flourishing growth and sewers will, therefore, be required in the near future.

It will be seen that only one of the sub-districts is in immediate need of sanitary sewers. However, the proximity of the water works intake of Toledo, and the occasional upstream flow of the Maumee River makes it desirable to prevent as far as possible any pollution of the river. It is only by providing sewerage before the district becomes populated that the proper disposal of sewage will occur.

ACTION OF THE BOARD.

At a meeting held January 22, 1913, the State Board of Health considered the report of its committee, Dr. Oscar Hasencamp, President, and Mr. W. H. Dittoe, Chief Engineer, on the necessity for sanitary sewerage for Main Sewer District No. 3, Lucas County.

The county commissioners were notified that this report was approved and the following resolution adopted:

WHEREAS, the board of county commissioners of Lucas County, Ohio, pursuant to the provisions of Section 1 of an act of the General Assembly of the State of Ohio passed May 31, 1911, approved June 8, 1911, and entitled "An act authorizing the Board of County Commissioners of the several counties of the state to provide for the construction of sewers outside of the municipalities and to provide for the cost and expense thereof," have laid out and established Lucas County, Ohio, Main Sewer District No. 3 within that portion of Lucas County which lies within three miles of the city of Toledo, to-wit:

The lots and lands in that part of Town 3, United States Reserve of twelve miles square at the foot of the Rapids of the Miami of Lake Erie, in Lucas County, Ohio, and being within the following described boundaries, to-wit:

Beginning at the point where the North line of River Tract 16 intersects the Northwest shore of the Maumee River, thence Westerly along said North line of River Tract 16 to the Center line of the Miami and Erie Canal; thence Southwesterly along said Center line of the Miami and Erie Canal to its intersection with the East and West Center line of River Tract 16; thence westerly along said East and West Center line of River Tract 16 to the Center of the Monroe Turnpike (Detroit Avenue so-called); thence Northeasterly along the Center line of the Monroe Turnpike (Detroit Avenue so-called) to the center of Glendale Avenue; thence Easterly along the Center line of Glendale Avenue to the East line of Section 16; thence Southerly along the East line of Section 16 to the Northwest shore of the Maumee River; thence Southwesterly along the Northwesterly shore of the Maumee River to the place of beginning, and,

WHEREAS, Upon investigation, this Board finds that one or more main sewers are necessary in the above described district, therefore, be it

Resolved, That pursuant to the provisions of Section 2, of an act of the General Assembly of the State of Ohio, passed May 31, 1911, approved June 8, 1911, and entitled, "An Act authorizing the Board of County Commissioners of the several counties of the state to provide for the construction of sewers outside of the municipalities, and to provide for the cost and expense thereof," it is necessary to construct one or more main sewers in said Main Sewer District No. 3, and, be it further

Resolved, That the Board of County Commissioners of Lucas County, Ohio, are hereby respectfully requested to have prepared the necessary plans and specifications for a main sewer or sewers and sewage treatment works in Lucas County, Ohio, Main Sewer District No. 3, and submit the same to this Board for approval.

REPORT ON PROPOSED SEWERAGE FOR SUB-DISTRICT NO. 3, MAIN SEWER DISTRICT NO. 3, LUCAS COUNTY.

On December 12, 1912, Mr. William H. Gould of Toledo, sanitary engineer for Lucas County, submitted plans and specifications for proposed sanitary sewers for sub-district No. 3, main sewer district No. 3, Lucas County. These plans and specifications were submitted in anticipation of the action of the State Board of Health declaring the necessity for sanitary sewerage for main sewer district No. 3. On January 22, 1913, the Chief Engineer held a conference at Columbus with Mr. Lewis E. Mallow, assistant prosecuting attorney of Lucas County, Mr. Gould, and Mr. R. B. Wiltsie of Toledo, president of The Wiltsie Reality Company, which owns the greater portion of the acreage of sub-district No. 3. On December 17, 1912, the Chief Engineer examined main sewer district No. 3 and sub-district No. 3, with reference to proposed sewerage. The following report was submitted:

Main sewer district No. 3, Lucas County, embraces an area of 467 acres and is situated northwest of the Maumee River immediately south of the southern corporation line of the city of Toledo. The district has been sub-divided into four sub-districts designated as Nos. 1, 2, 3, and 4. These sub-districts are formed naturally by Delaware Creek and the Miami and Erie Canal which cross the district in an easterly and southerly direction, respectively. Delaware creek is a small stream with a watershed area of 2.7 square miles which enters the Maumee River a short distance below the water works intake of the city of Toledo. The stream at present receives no sewage pollution.

At the present time sub-district No. 1, which borders the Maumee River, is built up and has several private sewer outlets discharging into the river. Improved sewerage facilities are required. The other three sub-districts are not built up to a large extent, but sewers with sewage treatment are necessary in view of future building to prevent any possible pollution of Delaware Creek.

Sub-district No. 3 is owned largely by The Wiltsie Realty Company, and will probably be developed and built up to some extent within the next few years. The county commissioners of Lucas County have proposed to sewer this sub-district in advance of the construction of sewers in the main sewer district as a whole. It should be noted that sub-district No. 1 requires sewers at the present time and the immediate plans of the county commissioners should provide sewers for this sub-district. The plans of the county sanitary engineer for sewerage for sub-district No. 3, provided for the installation of 8-inch, 10-inch, and 12-inch sewers in the following lengths:

8-inch	7,306 feet
10 "	2,570 "
12 "	1,930 "

The sewers will be built of vitrified pipe, the joints being sealed with cement to prevent the entrance of ground water. The outlet of the system will be carried to a point near the intersection of the four sub-districts, to which point the sewage from all sub-districts will be ultimately conveyed.

The plans do not provide for the installation of sewage treatment works which will be required to prevent the creation of a nuisance in Delaware Creek. At the conference held January 22, 1913, it was learned that the county will not construct sewage treatment works until sewerage for other portions of main sewer district No. 3 has been installed. To provide for the treatment of the sewage from sub-district No. 3, however, The Wiltsie Realty Company has proposed to the county to construct at its expense a temporary sewage treatment plant of a design satisfactory to the State Board of Health. It is proposed to utilize this plant temporarily until the county shall have provided a permanent plant for the main sewer district. Tentatively it is proposed to construct a temporary plant consisting of two sedimentation tanks and intermittent sand filters. Such a plant will satisfactorily treat the sewage to an extent that it will not be detrimental to the character of Delaware Creek.

ACTION OF THE BOARD.

At a meeting held January 22, 1913, the State Board of Health considered the request for approval of the general scheme for sewerage for Sub-district No. 3, main sewer district No. 3, Lucas County, plans for which were received December 12, 1912, from Wm. H. Gould, county sanitary engineer, and approved, the same subject to the following conditions:

1st. That comprehensive plans for sewerage and sewage treatment for main sewer district No. 3 be submitted to the State Board of Health by the county commissioners of Lucas County prior to July 1, 1913.

2nd. That before any connections to the sewers in sub-district No. 3 are permitted, a sewage treatment plant of a design satisfactory to the State Board of Health be constructed.

3rd. That such treatment plant be utilized for a period not to exceed one year, at the end of which time the plant shall be abandoned and removed and the sewage treated in a plant to be constructed by the county commissioners of Lucas County to serve main sewer district No. 3; and, 4th. That this approval shall be void unless the proposed sewerage for sub-district No. 3, main sewer district No. 3, Lucas County, and sewage treatment works for the same shall have been constructed prior to July 1, 1913.

On May 27, 1913, a resolution of the board of county commissioners, Lucas County, was received requesting an extension of approval of proposed sewerage for Sub-district No. 3, Main Sewer District No. 3, Lucas County, granted by the Board January 22, 1913. This resolution was referred to the engineering department and the following report was submitted:

One of the conditions of approval of sewerage for Sub-district No. 3, Main Sewer District No. 3, Lucas County, granted January 22, 1913, provided that plans for sewerage and sewage treatment for Main Sewer District No. 3 should be submitted to the State Board of Health prior to July 1, 1913; also that the proposed sewerage and temporary sewage treatment plant for Sub-district No. 3, Main Sewer District No. 3, should be constructed prior to July 1, 1913. It has been impossible for the county commissioners to have the necessary plans prepared and to execute the construction work of sewerage and temporary sewage treatment plant required. A reasonable extension of the time should be allowed to permit the preparation of plans and execution of the work required.

ACTION OF THE BOARD.

At a meeting held June 26, 1913, the State Board of Health considered a request of the board of county commissioners received May 27, 1913, for an extension of the approval of proposed sewerage for Sub-district No. 3, Main Sewer District No. 3, Lucas County, granted by the Board January 22, 1913.

The Board voted to revise the first and fourth conditions of said approval to read as follows:

> "1st. That comprehensive plans for sewerage and sewage treatment for Main Sewer District No. 3 be submitted to the State Board of Health by the county commissioners of Lucas County prior to November 1, 1913."
>
> "4th. That this approval shall be void unless the proposed sewerage for Sub-district No. 3, Main Sewer District No. 3, Lucas County, and sewage treatment works for the same shall have been constructed prior to October 1, 1913."

REPORT ON PROPOSED TEMPORARY SEWAGE TREATMENT PLANT FOR SUB-DISTRICT NO. 3, MAIN SEWER DISTRICT NO. 3, LUCAS COUNTY, NEAR TOLEDO.

On May 22, 1913, plans for a proposed temporary sewage treatment plant for Subdistrict No. 3, Main Sewer District No. 3, Lucas County, prepared by Mr. R. Winthrop Pratt, consulting engineer, were submitted by The Wiltsie Realty Company of Toledo, which company proposes to construct the plant. The plans were referred to the engineering department and the following report was submitted:

In January 1913 the State Board of Health approved of the general scheme for sewerage for Sub-district No. 3, Main Sewer District No. 3, Lucas County, providing as one of the conditions of approval, that a sewage treatment plant of a design satisfactory to the State Board of Health be constructed, to be used temporarily pending the installation of a permanent plant for Main Sewer District No. 3. The plans of the consulting engineer provide for the installation of a plant comprising a sedimentation tank of the two-story type, a sludge filter, a dosing chamber, and intermittent sand filters. The plant is designed to serve a population of 120, and in view of the fact that the present population of Sub-district No. 3 is less than 25, it would appear that the provisions are ample for the time during which the temporary plant will be in use. The sewage flow for which the plant is designed is 3600 gallons per day, equivalent to 30 gallons per capita.

Site. The location for the sewage treatment plant is in the valley of Delaware Creek immediately north of the stream and west of the Miami and Erie Canal which crosses the creek about 40 feet above the stream bed. The embankment of the canal will thus shield the plant in an easterly direction, and owing to the contour of the ground the plant will be practically unexposed in a northerly direction. During the life of the temporary plant it will not become objectionable due to its location.

Sedimentation Tank. The sedimentation tank which is of the two-story type with separate sewage and sludge compartments will be built of timber, except for the hopper bottom of the sludge well which will be of concrete. The plant is circular in plan, 6 feet in diameter, and is 12 feet in depth. The sedimentation compartment is 4 feet in width and provides a straight flow across the tank. Its capacity is 645 gallons furnishing a period of retention of 3.2 hours upon a basis of a maximum hourly flow of 200 gallons. The sludge compartment which is below the sedimentation compartment has a capacity of 57 cubic feet which furnishes a sludge retention of 90 days with 120 population tributary. The bottom of the sludge well is 11 feet below the flow line. A 6-inch cast iron pipe leads from the bottom of the sludge well to the sludge filter to which the sludge may be removed by gravity. A hinged wooden cover is provided for the tank to avoid dissemination of odors.

Sludge Filter. For the drying of the sludge a small filter with an area of 900 square feet will be provided. This area is sufficient for a population of 300.

Dosing Chamber. The dosing chamber which is 10 by 8 feet in plan and 1.5 feet in depth, with a capacity of 900 gallons, will be constructed of concrete and timber, and will be provided with a wooden cover. It will receive the tank effluent and will discharge the same intermittently to the sand filters. A single 3-inch automatic siphon will be provided for this purpose.

Intermittent Filters. For the final treatment of the sewage two intermittent sand filters, each 16 by 31 feet in plan are provided. Either or both filters may be used to receive the sewage from the dosing chamber and regular alternation of operation may be secured by the changing of gates. The area of each unit is such that it will receive the dosing chamber discharge with a depth of 3 inches. The total area, 0.023 acre, will be used at an average rate of 150.000 gallons per acre per 24 hours with a sewage flow of 3,600 gallons daily, and will have a population load of 5,000 per acre with a population tributary of 120. Distributors are provided to assist in the application of the sewage and an underdrainage system will collect the effluent to a main discharge line. The plans include provision of wooden covers to shield the filters and for economical construction timber retaining walls will surround the filters.

Disposal of Effluent. The effluent from the plant will discharge into Delaware Creek, a small stream with a watershed area of three square miles. In extremely dry weather the flow practically ceases and it will be necessary to secure at all times efficient operation of the plant to avoid a nuisance. Below the point of discharge the stream flows through a narrow valley and discharges into the Maumee River one-half mile distant. This point is about three-fourths mile below the Toledo water works intake which is an added reason for requiring efficient operation of the plant.

ACTION OF THE BOARD.

At a meeting held June 26, 1913, the State Board of Health approved the plans, prepared by Mr. R. Winthrop Pratt, consulting engineer, and submitted by The Wiltsie Realty Company, of Toledo, on May 22, 1913, for a proposed temporary sewage treatment plant for Sub-district No. 3, Main Sewer District No. 3, Lucas County, subject to the following conditions:

1st. That the proposed temporary sewage treatment plant be abandoned and removed as soon as the commissioners of Lucas County shall have provided proper disposal of the sewage from Main Sewer District No. 3, and that the period of use of the plant shall not exceed one year;

2nd. That a competent man to attend to the operation of the plant be employed by The Wiltsie Realty Company, or by the commissioners of Lucas County;

3rd. That the filtering material shall be approved by the Engineer of the State Board of Health before the same is placed; and.

4th. That this approval shall be void unless the proposed temporary sewage treatment plant shall have been constructed prior to October 1, 1913.

REPORT ON PROPOSED STORM SEWERS FOR BEVERLY PLACE, MAIN SEWER DISTRICT NO. 3, LUCAS COUNTY.

On November 7, 1913, plans for proposed storm sewers for Beverly Place, Main Sewer District No. 3, Lucas County, were received from Mr. Wm. H. Gould, county sanitary engineer. The plans were referred to the engineering department and the following report was submitted:

Beverly Place, a real estate allotment owned by The Buckeye Realty Company and The Realty Trust Company of Toledo, has an area of 108.7 acres and is located about 1.5 miles southwest of the city of Toledo and about one-half mile northwest of the Maumee River. It is entirely included in Sub-district No. 3, Main Sewer District No. 3, and is contiguous to and immediately north of Rugby Place, a realty subdivision, storm sewers for which were approved by the State Board of Health September 2, 1913.

At the present time Beverly Place is unoccupied, but it is expected to provide paved streets in the near future, and the population within two years will probably exceed one hundred. Sanitary sewerage for Beverly Place will be constructed by the Lucas County Commissioners in connection with a general system for Main Sewer District No. 3.

For the purpose of securing surface and shallow subsoil drainage it is proposed to install a system of storm sewers extending along the streets of the allotment. The sewers will be constructed of 10-inch, 12-inch, and 15-inch vitrified pipe and will have a total length of 5,830 feet. Twenty-four catch basins for the entrance of the surface drainage will be installed but no connections for sewage will be provided. The main outlet sewer will be connected with an existing 24-inch storm sewer extending along Detroit Avenue and discharging into Delaware Creek at a point a short distance north of the allotment. Below the point of outlet Delaware Creek flows about two miles to its confluence with the Maumee River, passing through Main Sewer District No. 3. Above the proposed outlet the stream has a watershed area of less than one square mile and the flow is intermittent. To prevent a nuisance the proper use of the proposed storm sewers must be strictly enforced.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the plans for proposed storm sewers for Beverly Place, Main Sewer District No. 3, Lucas County, received November 7, 1913, from Mr. Wm. H. Gould, county sanitary engineer, subject to the following conditions:

1st. That the board of county commissioners of Lucas County shall control the establishment of connections to the proposed sewers and shall prevent the discharge of sewage or other objectionable wastes into them; and,

2nd. That this approval shall be void unless the proposed sewers shall have been installed prior to January 1, 1915.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT WORKS FOR MANTUA.

On December 11, 1912, Mr. C. H. Bowen, village clerk of Mantua, submitted plans and specifications for proposed sewerage and sewage treatment works for the village, prepared by Mr. John S. Mallette, of Ravenna, engineer for the village. On December 20, 1912, the principal assistant engineer visited Mantua and the plans and specifications were later examined in the engineering department. The following report was submitted:

Mantua is a village with a population of about 730, located in Portage County on the Cuyahoga River. The village is a farming community and is experiencing practically no growth. The topography of the locality is slightly hilly, the difference in elevation within the village being several hundred feet. In the way of municipal improvements the village has a public water supply installed in 1902, and also a privately owned electric lighting system. The water supply is derived from drilled wells, is of good quality, and is used by approximately 80 per cent. of the population. At the present time the village is inadequately provided with sewerage and drainage facilities. Three short storm sewers which are misused to receive domestic wastes from some 75 dwellings, provide inadequate drainage of the village. Two of these sewers discharge into small ditches draining to the Cuyahoga River, while the third discharges directly into the river.

In September 1911, the State Board of Health was asked to approve a combined sewer to provide sewerage and drainage for the village. The village was informally advised that the proposed construction of the combined sewer was unsatisfactory and that comprehensive plans for sanitary sewers should be prepared by a competent engineer. Following this advice the village engaged the services of an engineer to prepare plans for a system of sanitary sewers and sewage treatment works.

PROPOSED SEWERAGE.

The plans of the consulting engineer provide for the installation of a separate system of sewers covering the entire built up portion of the village. The sanitary sewer system is laid out in three districts to conform to the topography. One of these districts will drain by gravity to the site for sewage treatment works, and the other two districts will drain to ejectors by means of which the sewage will be elevated to the gravity line. Ultimately a total of 9.15 miles of sanitary sewers will be installed and for immediate use it is proposed to construct 6.9 miles. The sewers will comprise 8 to 12-inch vitrified pipe and will be laid with cemented joints to exclude ground water. Manholes will be provided at all necessary points, and flushing manholes will be placed at dead ends to provide for cleansing of the sewers. For elevating the sewage from the low lying district, ejectors of the compressed air type will be installed. Two ejectors, each with a capacity of 50 gallons per minute will be provided, each of which is of sufficient size to lift the sewage from the district. In general the sewerage system is well designed according to the best modern practice.

. Improvements in surface drainage will be provided by installing several miles of storm sewers discharging at four outlets into the Cuyahoga River and tributary ditches.

PROPOSED SEWAGE TREATMENT WORKS.

The plans of the engineer for sewage treatment works provide for plain sedimentation tanks and intermittent sand filters. The design provides for the ultimate treatment of sewage of 3,000 persons, while the immediate installation is for a population of 1,000, corresponding to a sewage flow of 100,000 gallons per day.

Site. The proposed location for a treatment works, to which the main sewer line will convey the sewage by gravity, is in the valley of the Cuyahoga River immediately south of the village. The site is well removed from dwellings, there being but two within 1,000 feet of the site. A small grove between the site and the village will shield the plant and assist in preventing the dissemination of odors. The elevation of the site is sufficient to avoid any danger to the plant resulting from floods.

Sedimentation Tanks. For the preliminary treatment of the sewage three open, reinforced concrete sedimentation tanks are provided, two of which will be constructed immediately. These are designed for eight hours retention on a basis of 300,000 gallons sewage flow. One tank is, therefore, sufficient to provide satisfactory sedimentation for 100,000 gallons. The tanks are each 14 by 40 feet in plan, and 6 to 8 feet in depth, according to the elevation of the adjustable weirs. The tanks are properly baffled at the inlet and outlet ends and the floors will slope to sludge drains, located at the inlet ends of the tank. It is probable that a greater slope of the floors would increase the efficiency of removal of the sludge. Ten-inch lift valves are provided at the sludge drain openings, operated by means of hooks. Considerable difficulty in operation will be avoided by providing handles suitably fastened to the valves. The dissemination of odors will be avoided largely by covering the tanks.

Dosing Chamber. An open, reinforced concrete dosing chamber with a capacity of 11,550 gallons, adjoins the sedimentation tanks and receives the effluent from them. The structure is 20 by 14 feet in plan, and 5.5 feet in depth, and will contain ultimately six 5-inch sequence siphons. The chamber is not provided with a housing or cover, which will be required to prevent freezing of the apparatus. A drain from the dosing chamber should also be included to be used in case of the necessity of repairing the apparatus. The general design of the dosing chamber is satisfactory, its capacity being sufficient to flood the filter units to a depth of 2 inches.

Filters. Four sand filters, each with an area of 0.23 acre, will be installed immediately. These provide for a rate of operation of 109,000 gallons per acre per day when the sewage flow is 100,000 gallons per day. On the basis of the present population, however, the rate will be 800 persons per acre. The design of the filters is in general satisfactory. The filtering material will comprise 3 feet of sand underlaid by 6 inches of gravel, ½ inch to 2 inches in size. The necessity of an intermediate layer to prevent washing of the sand into the underdrains is apparent. The underdrains are specified to consist of 4-inch farm tile, whereas vitrified salt glazed sewer pipe should be used. Four-inch ventilators extend from the underdrains to an elevation one foot above the surface of the sand. These will not add to the efficiency of the filters, and inasmuch as they offer opportunity for the passage of unfiltered sewage into the underdrains, should be omitted. The outlet from the filters into the Cuyahoga River is protected by a concrete bulkhead and is provided with a flap valve.

Sludge Filter. For drying the solids removed from the settling tanks a sludge filter 37½ feet square and 1,406 square feet in area is provided. The construction is similar to that of the intermittent filters, except that 2 feet of coarse sand is employed as filtering material. Assuming that the sludge filters will receive the entire contents of a tank at one charge, the area is insufficient, as the flooding will reach a depth of 2.4 feet. Sufficient area should be provided to make impossible a flooding depth greater than one foot. The outlet from the sludge filter is into the Cuyahoga River directly, and is protected by a concrete bulkhead and provided with a 10-inch flap valve.

By-pass Facilities. In case of emergency the crude sewage or settled sewage may be diverted from the plant. Facilities are provided whereby the crude or settled sewage may in emergency be discharged upon the sludge filter or directly into the Cuyahoga River. The presence of these by-pass facilities offers an opportunity for pollution of the stream, the danger of which will be recognized in considering the use to which the river is placed.

Cuyahoga River. The Cuyahoga River, which will receive the effluent from the plant, has a watershed area above Mantua of about 173 square miles. Its flow at Mantua is sufficient at all times to properly dilute the sewage from 1,000 persons receiving less treatment than sand filtration will provide. Eleven miles below the plant, however, the city of Akron is locating a dam to impound a reservoir to be used as the water supply of the city. The upper portion of this reservoir will be 4 miles below the proposed sewage treatment works at Mantua. Very efficient treatment of the sewage at all times will, therefore, be required to protect the Akron water supply.

SUMMARY.

From the foregoing report it will be noted that plans for the proposed sewerage and sewage treatment works for Mantua provide in general for a proper installation. The sewerage system is well designed in all respects and with proper maintenance of the system the sewage will be delivered in a fresh condition at the treatment works. The design of the treatment works is in general satisfactory, although there are several minor improvements which should be made to aid in the operation and add to the efficiency of the plant. These include (1) an increased slope of the floors of the sedimentation tanks; (2) the provision of proper handles for the lift valves in the sludge drains; (3) the covering of the sedimentation tanks; (4) the housing of the dosing apparatus; (5) the draining of the dosing chamber; (6) the provision of vitrified pipe for the filter underdrains; (7) the ventilators connecting with the underdrains should be omitted; (8) the provision of an intermediate layer of gravel for the intermittent filters; and (9) an increased area of the sludge filter.

The proximity of the proposed new water supply for Akron will require that the sewage from Mantua be purified to a high degree at all times. Under ordinary conditions a plant of the type designed will purify the sewage to a satisfactory extent, but in case of the occurrence of an epidemic of typhoid fever at Mantua the infection might pass the plant and reach the water supply of Akron. To guard against such an emergency apparatus for the disinfection of the effluent should be provided to be placed in service when the conditions require. A strict supervision over the use of the by-pass facilities should also exist at all times, and for this purpose the local health officials or other proper officials should be delegated with this duty.

ACTION OF THE BOARD.

At a meeting held January 22, 1913, the State Board of Health approved the plans and specifications for proposed sewerage and sewage treatment works for Mantua, prepared by Mr. John S. Mallette of Ravenna, engineer for the village, and submitted by Mr. C. H. Bowen, village clerk, December 11, 1912, subject to the following conditions:

1st. That immediately after the completion of the sewerage system and sewage treatment works all connections conveying domestic sewage to the existing storm sewers be discontinued and connections with the sanitary sewers established; and that the council by ordinance satisfactory to the Secretary of the State Board of Health regulate the proper use of sanitary and storm sewers;

2nd. That the treatment works be installed and ready for operation before any connections to the sanitary sewers are permitted;

3rd. That the village council appoint a competent superintendent of sewers, whose duties shall also include supervision of the operation of the sewage treatment works;

4th. That the valves on all by-pass lines at the works be provided with locks, the keys to be kept in the custody of the mayor or health officer of the village; and that the valves shall not be opened without notifying the State Board of Health at least twenty-four hours before such opening; and,

5th. That the design of the treatment works be modified as follows:

a. By the provision of apparatus for the disinfection of the effluent from the intermittent and sludge filters, such apparatus to be used at all times;

b. By providing a cover or housing for the dosing chamber;

c. By omitting the ventilators for the sand filters;

d. By increasing the sludge filter area to at least 3,000 square feet;

6th. That samples of all filtering material be submitted to and receive the approval of the Engineer of the State Board of Health; and,

7th. That this approval shall be void unless revised plans satisfying condition No. 5 shall have been submitted to the State Board of Health prior to May 1, 1913, and the sewerage system and sewage treatment works installed prior to January 1, 1915.

The village engineer was advised that the following revisions in the plans for the sewage treatment works were desirable and would aid in the operation and add to the efficiency of the works:

1. An increased slope of the floors of the sedimentation tanks;
2. Provision of proper handles securely attached to the lift valves in the sludge drains;
3. Provision of a cover for the sedimentation tanks;

4. Provision of a drain leading from the dosing chamber;

5. Provision of vitrified salt glazed bell and spigot sewer pipe for underdrains in the filters; and.

6. Provision of an intermediate layer of gravel 46 inches in thickness ⅛-inch to ¼-inch in size between the sand and coarse gravel in the filters.

The village authorities were advised that in taking the foregoing action the State Board of Health carefully considered the proximity of the proposed new water supply for the city of Akron which is to be taken from a reservoir formed by a dam eleven miles below the outlet from the proposed treatment works.

The Board emphasized the danger of pollution of this water supply by the effluent from the proposed sewage treatment works unless the works were operated efficiently at all times. The authorities were also advised of the especial importance of the use of a disinfectant to provide a high degree of purity to the effluent and it was to be understood that the approval of the Board would not be in effect until the foregoing conditions had been complied with.

REPORT ON PROPOSED SEWAGE TREATMENT PLANT FOR MAPLEWOOD BEACH HOTEL, NEAR CLEVELAND.

On April 17, 1913, Mr. R. Winthrop Pratt, consulting engineer, submitted plans for proposed sewage treatment plant for the Maplewood Beach Hotel, near Cleveland. On April 28, 1913, the principal assistant engineer made an examination of the proposed improvement and the plans were examined in the engineering department. The following report was submitted:

Maplewood Beach Hotel is located on Lake Erie about 13½ miles east of the center of the city of Cleveland. The hotel together with six cottages on the same property are occupied by a population of about 200 during the summer months. At other portions of the year the hotel and cottages are vacant. A water supply is obtained from Lake Erie and is furnished to the consumers without treatment. Sewerage has been installed to provide conveniences for the hotel and cottages. A cesspool has been installed to receive the sewage but this method of disposal has become unsatisfactory. The overflow from the cesspool reaches the lake which is about 40 feet to the north and not only creates the danger of pollution of the water supply, but also causes a nuisance on the shore.

PROPOSED SEWAGE TREATMENT PLANT.

In order to improve conditions attending the disposal of sewage it is proposed to divert the sewage from its present outlet into the lake by pumping it in a southerly direction to a site where it may be filtered, the effluent from the filters being carried back to the lake through a small ditch. The plans of the consulting engineer provide for the utilization of the existing cesspool as a settling tank, the provision of a pump well by constructing a concentric tank around the cesspool, pumping equipment. and filters. The installation is to serve a population of 200 or a sewage flow of 6,000 gallons daily.

The existing cesspool which will be utilized as a settling tank will be water proof with concrete to prevent seepage. It is circular in plan 8 feet in diameter and 7½ feet in depth to its flow line, thus furnishing a capacity of 2,800 gallons, or 9.3 hours storage based upon the total daily flow of 6,000 gallons. The concentric pump well formed by the annular spaces between the cesspool wall and the new concrete wall is 2 feet in width and 7½ feet in depth. Its capacity is, therefore, 4,000 gallons which makes a total period of retention through the sedimentation tank and pump well of 27 hours. Both the sedimentation tank and pump well will be covered with a flat concrete roof provided with a manhole.

The settled sewage will be dumped from the annular compartment by means of a small centrifugal pump operated by a three horse power motor. The operation of this equipment will be automatic and controlled by a float actuated switch. The pumping equipment is placed in a rectangular concrete covered pit 8 feet by 4 feet 6 inches in plan, and 6 feet in depth. Sludge piping is shown in the plans to facilitate sludge removal. It consists of a 6-inch line discharging at the shore of the lake. A total head of about 15 feet is available between the flow line of the tank and the outlet, thus permitting gravity discharge. It is important that no sludge be discharged during the summer season when the water supply is in operation.

For the final treatment of the sewage two filters, each 23 feet 8 inches square, are provided. These will be placed at a point 1,800 feet south of the lake at an elevation 8 feet above the flow line of the sedimentation tank. The location is fairly satisfactory although there are four residences within 600 feet of the filters. Very careful operation will, therefore, be necessitated. The total area, 11,000 square feet, is such as to provide a rate of operation of 230,000 gallons per acre per day and a population load of 8,000 persons per acre. This excessive rate of operation will probably cause clogging of the beds and the production of odors. It will be necessary to provide at least one additional unit increasing the area 50 per cent, and it would be advisable to provide covers for the filters to be used in case of complaint against odors and also to protect the filters during the winter season when they will remain idle.

The filtering material provided will comprise sand or cinders 3 feet 6 inches in depth. It will be necessary to receive samples of the material for approval before the construction of the plant. The outlet from the filters is at a point 425 feet north of the filters and directly south of the Lake Shore Boulevard. At this point the effluent will enter a ditch which flows in a westerly direction entering a small stream about 550 feet below the outlet, which discharges into Lake Erie about 1,000 feet west of the Maplewood Beach Hotel. With proper operation of the plant no objection should arise from the disposal of the effluent.

ACTION OF THE BOARD.

At a meeting held May 22, 1913, the State Board of Health approved plans for the proposed sewage treatment plant for the Maplewood Beach Hotel, near Cleveland, submitted by Mr. R. Winthrop Pratt, consulting engineer, April 17, 1913, subject to the following conditions:

1st. That the filter area be increased 50 per cent over that shown on the plans by the addition of a third unit;

2nd. That covers for the filters be provided to be used in case of excessive odor production and during the periods when the plant will not be in service;

3rd. That sludge be discharged from the sedimentation compartments only after the summer season has terminated, and when the water supply has been thrown out of service;

4th. That samples of the filtering material be submitted to and receive the approval of the State Board of Health before the material is placed in the filters;*

5th. That this approval shall be void unless the sewage treatment plant shall have been constructed prior to July 1, 1913.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT PLANT FOR MARYSVILLE.

On February 13, 1913, plans for proposed sewerage and sewage treatment works for Marysville, prepared by Mr. R. Winthrop Pratt, consulting engineer, were submitted to the State Board of Health for approval. On February 8, 1913, a copy of the resolution of council approving the plans was received. On February 13, 1913, one of the assistant engineers visited Marysville and examined the proposed improvements and later reviewed the plans of the consulting engineer. The following report was submitted:

Marysville, a village with a population of about 3,600, is located in Union County on Mill Creek a tributary of the Scioto River. The growth of the village at the present time is small. The topography is undulating, the drainage from the village reaching Mill Creek directly or by way of Town Run, a ditch extending through the central portion of the village in a northerly direction.

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*Approved June 3, 1913.

The village is provided with a public water supply which is operated under private ownership, and has a few short sewers discharging into Town Run and Mill Creek. The existence of the water supply and absence of sewerage facilities have brought about the misuse of storm sewers to receive domestic wastes and the discharge of such wastes through private drains into Town Run. The result of such procedure has been the creation of a nuisance in Town Run and also in Mill Creek at times of minimum flow. Moreover, the improper disposal of sewage has endangered the water supply of the city of Columbus which is obtained from a storage reservoir in the Scioto River, the upper portion of which is twenty-six miles below Marysville.

In October 1908 a petition under the Bense Act complaining of the discharge of sewage from Marysville and the pollution of the water supply of Columbus was received from the board of health of Columbus. Subsequently, in February 1911 an order of the State Board of Health, signed by the Governor and Attorney General requiring the installation of sewerage and sewage treatment works was transmitted to the mayor and council of the village. The litigation of the Bense Act has delayed the compliance with this order until the present time.

PROPOSED SEWERAGE.

The plan of sewerage provides for the installation of a complete system of sanitary sewers extending to all built up portions of the village and comprising ultimately 11.6 miles of sewers. For immediate installation it is expected to provide 8 or 9 miles which furnish facilities to 80 per cent of the population, or about 3,000 persons. The sewers will be constructed from 8-inch to 18-inch vitrified pipe laid with sealed joints to exclude ground water. Manholes will be provided at necessary points, those at the dead ends being used for flushing purposes. The sewerage system will be so designed as to permit of connection with the main sewer from the Ohio Woman's Reformatory, a state institution in progress of construction, located a short distance west of the village. This institution will ultimately accommodate 1,000 persons, but its population for the next five years will not exceed 300.

PROPOSED SEWAGE TREATMENT WORKS.

The plans of the consulting engineer provide for the installation of sewage treatment works comprising a screen chamber, settling tanks, contact filters and intermittent fine grain filters. The high degree of treatment which such a plant will produce is necessary both for the prevention of a nuisance in Mill Creek and for the protection of the water supply of Columbus. The plant will have a capacity of 480,000 gallons per day, assumed as the sewage flow from 6,000 persons tributary. Ultimate extensions may be made to provide for the treatment of 2,000,000 gallons daily flow.

Site. The location selected for the treatment works is immediately northeast of the village in the valley of Mill Creek. Options have been secured for 14 acres of land which will provide for the location of a plant at a point well removed from contiguous property. The site, is well selected as there are no houses within 1,000 feet in any direction, only two within 1,200 feet and ten or twelve wthin 1,500 feet. The topography is such that future building operations will be unimportant. The site will be overflowed by the highest floods only and diking of the plant will be provided.

Screen Chamber and Settling-Tanks. The sewage reaching the plant passes through a concrete screen and diverting chamber, from which it may pass to either of two settling tanks. The screens have 1-inch openings and will retain the coarser suspended particles. The settling tanks are of the two-story type and have separate sedimentation and sludge compartments. They are of reinforced concrete construction and are provided with concrete roofs to minimize disseminating odors. The total internal dimensions of each of the tanks are 33 feet length, 21 feet width and 23 feet 3 inches depth below the flow line. The sedimentation compartments extend lengthwise of the tank and are designed to operate in series. The total length of the flow will, therefore, be 66 feet in each tank. The total capacity of the sedimentation compartments is 79,000 gallons, representing four hours' period of retention. The sludge compartments of the tanks have a total capacity of 3,500 cubic feet which will provide 110 days' retention with a population tributary of 6,000. In general the settling tanks are well designed and will produce a well-clarified effluent.

Sludge Filter. The sludge from the settling tanks may be removed by gravity and discharged on to a sludge filter which is built along one side of the intermittent fine grain filters. It is 353 feet long by 8 feet wide and its area is 2,824 square feet, equivalent to 0.47 square foot per person tributary. The filtering material will be 2 feet of sand and the underdrainage system will connect with the main effluent drain from the plant.

Contact Filters. Four units of contact filters, each 90 feet square containing 4 feet of filtering material will receive the settled effluent from the tanks. These are built with reinforced concrete walls and concrete floors and are well provided with distributing and drainage facilities. The filling and emptying of the filters will be controlled by automatic timed siphons. The total area of the filters is 0.78 acre and the rate of operation is 2,000 persons per acre-foot, or 160,000 gallons per acre-foot per day.

Intermittent Fine Grain Filters. The contact effluent will be discharged on to four units of fine grain filters, each 125 by 175 feet, providing a total area of two acres. The rate of operation of these units will be 240,000 gallons per acre per day when all are in service. The filters will be used in sequence by the setting of hand operated valves permitting flow from a central gate chamber receiving the contact discharges. It should be noted that the operation of the filters is dependent upon the careful attention to the setting of the valves. The filters will contain 30 inches of sand or other fine material, depending upon future selection. The sewage will be discharged through distributors extending around and across the filters, and the effluent will be collected through an underdrainage system and diverted into a central discharge well. In this well the effluent may be sterilized with calcium hypochlorite and at times of extreme high water, may be pumped into the stream, by the operation of a vertical motor driven centrifugal pump.

Mill Creek. Mill Creek, the stream which will receive the effluent from the works, has an estimated watershed area above Marysville of 65 square miles, upon which there is a rural population of 2,500. The minimum dry weather flow of the stream is estimated at 2 cubic feet per second, and the mean summer flow probably does not exceed 5 cubic feet per second. It must, therefore, receive a well-treated effluent if a nuisance is to be avoided. Furthermore, the water supply of Columbus is taken from the Scioto River at a point 37 miles below Marysville after sedimentation in a storage reservoir in the Scioto River. These conditions further require a well-treated effluent.

SUMMARY.

From the foregoing report it will be noted that the village of Marysville, in compliance with an order of the State Board of Health issued February 1911, has had prepared the necessary plans for sanitary sewers and sewage treatment works. The design is in general satisfactory and the installation of the sewers and sewage treatment works will not only improve the conditions at Marysville but will also protect the water supply of Columbus.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held February 20, 1913, the plans for proposed sewerage and sewage treatment plant for Marysville, submitted by Mr. R. Winthrop Pratt, consulting engineer for the village, February 13, 1913, were approved subject to the following conditions:

1st. That the proposed sewage treatment plant be constructed before any connections to the sanitary sewers are permitted;

2nd. That the village council enact an ordinance satisfactory to the

Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers; providing a proper official to supervise the maintenance of the sewers and sewage treatment works, and providing that within two months after the completion of the sanitary sewers and sewage treatment works, all sewage treatment works and all existing sewer corrections in violation of the ordinance be removed.

3rd. That samples of all filtering material be submitted to and receive the approval of the Engineer of the State Board of Health;

4th. That plans for automatic apparatus to control the operation of the contact and intermittent filters be submitted to the State Board of Health;

5th. That the sewage treatment works be enlarged, or otherwise modified, when required by the State Board of Health; and,

6th. That this approval shall be void unless the proposed sewers and sewage treatment works shall have been installed prior to June 1, 1914.

The Secretary was instructed to advise the consulting engineer that in the opinion of the State Board of Health,

1st. The design should be revised by providing for automatic sequence of operation of the intermittent fine grain filters; and,

2nd. Valves or plugs in the sludge riser pipes should be added to provide control in the removal of sludge.

REPORT ON PROPOSED STORM SEWER FOR MAUMEE.

On February 19, 1913, Mr. George Champe, of Toledo, consulting engineer for Maumee, submitted plans for a proposed storm sewer for the village. On March 6, 1913, one of the assistant engineers visited Maumee and investigated the proposed improvement. The following report was submitted:

Maumee, a village with a population of 2,300, is located in Lucas County on the Maumee River, about five miles above the city of Toledo. The village has no municipal improvements at the present time, although negotiations are being made for the installation of a public water supply to be obtained from the city of Toledo. A storm sewer with several laterals has been installed and discharges into the Maumee River. Plans for this sewer were not submitted to the State Board of Health for approval and at the present time the sewer is misused to some extent to receive sanitary sewage. In addition there are several private drains leading to the river which receive domestic wastes. The total volume of sewage discharged into the river from these several outlets is small.

Proposed Sewer. The northeasterly portion of the village lies between the Wabash Railroad and the Miami and Erie Canal, the latter forming the southeasterly boundary. Owing to the presence of the canal embankments, drainage to the Maumee River is interfered with and it has become necessary to construct ditches carrying the drainage to Swan Creek. Flatness of the topography makes the flow in these ditches very slow. To correct the existing conditions the village proposes to install a storm sewer extending from a point about 50 feet north of the canal to the Maumee River. The sewer will have a total length of about 1,000 feet and will be five feet in diameter. It will be constructed of brick or concrete. The area of the district north of the canal to be drained by the proposed sewer is 430 acres. It is at present principally farm land and contains only three houses, which are located at the edge of the built up portion of the village. South of the canal the sewer will provide means for drainage for a built up portion of the village. Although it is not proposed to use the sewer at present to supply drainage south of the canal, it is likely that future laterals for surface drainage will be installed.

There appears to be no reason for prohibiting the installation of the sewer but inasmuch as it will pass through the village and thereby provide an outlet for future connecting sewers, it is necessary that provision be made to prevent the misuse of the sewer.

ACTION OF THE BOARD.

At a meeting held March 20, 1913, the State Board of Health approved the plans for a proposed storm sewer for Maumee, submitted February 19, 1913, by Mr. George Champe, consulting engineer for the village, subject to the following conditions:

1st. That before contracts for the installation of the sewer are awarded, the village council by ordinance shall provide:

a. That no connections for sanitary purposes to the proposed sewer or future laterals be permitted.

b. That no future laterals having connections for sanitary purposes be connected with the proposed sewer.

2nd. That this approval shall be void unless the proposed sewer shall have been constructed prior to January 1, 1914.

The village authorities were advised to submit a draft of the proposed ordinance, incorporating the points mentioned, to the Secretary of the State Board of Health for approval prior to its passage.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT FOR THE MICHIGAN CENTRAL RAILROAD COMPANY, TOLEDO.

On May 27, 1913, a plan for a proposed sewage treatment plant accompanied by a statement relative to proposed sewerage for the Michigan Central Railroad Company's yards at Toledo, were received from Mr. J. F. Deimling, engineer of construction, Michigan Central Railroad Company, Detroit, Michigan. The plans were referred to the engineering department for investigation and on June 19, 1913, the principal assistant engineer visited Toledo and examined the proposed improvement. The following report was submitted:

The Michigan Central Railroad maintains a switching yard located in the extreme northerly portion of the city of Toledo immediately east of Ten Mile Creek. At the present time new buildings, including a round house, boiler house and office building are being constructed. The number of employes does not exceed 20.

The proposed sewerage comprises an 18-inch sewer, 6,000 feet in length, and two 6-inch branch sewers, each 100 feet in length. The sewers will be constructed of vitrified pipe with cemented joints. Manholes will be provided at all changes of grade and direction and in general the construction will conform to accepted practice.

The sewers will receive the sewage from twenty persons and the waste water from engine boilers. The quantity of the sewage will probably not exceed 1,000 gallons per day, and the total dry weather flow will probably not be in excess of 10,000 gallons per day. It is proposed to divert surface drainage to the sewer by connecting a ditch draining an area of 100 acres at a point 1,200 feet above the outlet. This will probably increase the flow during storms and must be considered an objectional feature in view of the necessity of treating the sewage.

Before the sewage is discharged into Ten Mile Creek it is proposed to clarify it by passing it through a sedimentation tank. The design provides a covered reinforced concrete tank 20 by 10 feet in plan and 6.5 feet in average depth. Its capacity is approximately equivalent to twenty-four hours' sewage flow on the basis of 10,000 gallons per day. A small grit chamber is provided at the inlet end to intercept the coarser suspended solids. A weir chamber to control the depth of flow is placed at the outlet end of the tank.

For the treatment of the dry weather flow the tank will probably serve satisfactorily. During excessive rainfall, however, it is likely that the solid matter in the tank will be agitated and a low efficiency of removal of suspended matter will result. It would be desirable to dispose of the drainage from the above mentioned ditch by other means than the proposed sewer. In this event the grit chamber could be omitted. The discharge from the tank will be carried to Ten Mile Creek through a 15-inch effluent line. The outlet is about six miles above the mouth of the creek, to which point the stage of the stream is influenced by the level of the lake. Ten Mile Creek is already notoriously polluted by the sewage of Toledo and the city is at present engaged in the preparation of plans for a system of intercepting sewers to improve the existing conditions. With the construction of an intercepting sewer the proposed sewer will be provided with a satisfactory outlet. In the meantime, the proposed septic tank will accomplish a satisfactory clarification of the sewage prior to its discharge into Ten Mile Creek.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, the plan for proposed sewerage and sewage treatment for the yards of the Michigan Central Railroad at Toledo, received from Mr. J. F. Deimling, engineer of construction, May 27, 1913, was approved subject to the following conditions:

1st. That an outlet other than the proposed sewer be provided for the flow from a ditch draining approximately 100 acres proposed to be diverted to the sewer;

2nd. That the design of the septic tank shall be revised in a manner satisfactory to the engineer of the State Board of Health by providing proper facilities for the removal and disposal of sludge;

3rd. That the proposed septic tank shall be abandoned and removed at such time as an outlet for the proposed sewer shall have been provided by the construction of an intercepting sewer along Ten Mile Creek by the city of Toledo; and,

4th. That this approval shall be void unless the proposed sewerage and sewage treatment plant (satisfactorily revised) shall have been installed prior to January 1, 1914.

REPORT ON PROPOSED ADDITIONAL SEWERS AND SEWAGE TREATMENT WORKS FOR MT. VERNON.

On July 15 and 17, 1913, plans for proposed additional sewerage and sewage treatment works for Mt. Vernon were received from Mr. R. Winthrop Pratt, consulting engineer for the city. On July 12, 1913, prior to the submission of the plans, a copy of a resolution of the city council adopting the plans was received. On July 7, 1913, a preliminary examination of the proposed improvements was made by one of the assistant engineers. The plans were referred to the engineering department and the following report was submitted:

Mt. Vernon, the county seat of Knox County, has a population of approximately 9,800. It is located on the Kokosing River, which forms the southerly corporation line of the city. The topography of the city and surrounding country is hilly. Mt. Vernon is one of the oldest residence cities in the state. At the present time it has few municipal improvements, which include a public water supply; obtained from drilled wells; less than one mile of pavement; and an inadequate sewerage system. It is proposed at the present time to install additional sewers and a sewage treatment plant.

Actions of the State Board of Health. Proposed sewerage for Mt. Vernon was first brought to the attention of the Board in 1897, when it was decided to construct sewers in District No. 2. After consideration the Board approved the plans, notification of which approval was furnished the local officials in a communication under date of July 14, 1897.

In 1903 it was desired to extend the sewerage system by constructing sewers in District No. 3. The Board considered the question and on September 3, 1903, a letter was written, advising the board of public service that the State Board of Health voted to disapprove plans for additional sewerage unless some provision was made for purifying the sewage.

In 1906 the Board considered the proposal to construct sewers in West Vernon, a suburb of Mt. Vernon. Following the precedent set in 1903, in regard to the pollution of the Kokosing River, it was decided to disapprove the proposed installation unless a sewage purification plant was constructed at the same period.

In 1908 the city employed The Riggs and Sherman Company of Toledo, to make preliminary studies and estimates of cost for a complete system of sanitary sewers and a sewage purification plant. The plan furnished the city by The Riggs and Sherman Company was never submitted to the State Board of Health.

On July 5, 1912, a general plan for proposed sewers was received from the city engineer, and on July 10, 1912, a communication from the director of public service, asking approval of the plan. The proposed additional sewers were reported upon by the engineering department. On July 19, 1912, after consideration of the report, the State Board of Health voted to withhold its approval of the plan and to require revised plans providing separate sewers and sewage treatment works.

Existing Sewerage. The city is divided into four sewer districts, all of which are inadequately supplied with sewerage facilities. District No. 1 is a long narrow strip, extending in a northerly and southerly direction through the central portion of the city, and has a population of approximately 1,500. The sewers in this district, which are built on the combined plan, were installed in 1891, before the State Board of Health had been given jurisdiction in the installation of sewers. The outlet is a 36-inch brick sewer discharging into the Kokosing River at the Main Street bridge. There are also two privately constructed sewers in District No. 1 discharging into the river near Main Street. District No. 2 includes the easterly portion of the city and has an estimated population of 4,500. There are five miles of combined sewers in this district, constructed in 1897. The outlet is an 18-inch sewer entering the Kokosing River in the extreme southeasterly portion of the city and near the proposed location of the sewage treatment plant. District No. 3 and District No. 4 include the westerly portion of the city. District No. 3 has an estimated population of 3,000 and District No. 4 is at the present time sparsely populated. Neither district is supplied with sewers, and the need of suitable drainage and sewer facilities is urgent, especially in District No. 3. The total lengths of sewers already constructed by the city is approximately 7 miles, discharging into the Kokosing River at two outlets. Approximately 2,000 persons are tributary to the sewers.

Proposed Additional Sewerage. The plan for proposed additional sewerage as presented by the consulting engineer for the city provides for the extension of the existing system to cover the entire area of the city. The extensions will follow the separate plan and existing combined sewers will be converted to storm sewers as far as this is practical. The plan shows a total length of new sewers of 14 miles, ranging in size from 8 to 24 inches in diameter. Seventy-two per cent. of the total length of the sewer is 8 inches in diameter. Six thousand four hundred and ninety feet is 18 inches in diameter and 475 feet 24 inches in diameter. The sewers will be constructed of vitrified sewer pipe laid with cemented joints. An intercepting sewer will be placed along the north bank of the Kokosing River in order to intercept the sewage and carry it to the sewage treatment plant. The existing sewers together with the proposed sewers, will discharge into the interceptor. The plan shows 241 manholes, which will be placed at all changes of grade and direction. The grades of the sewers range from 0.1 per cent. as a minimum, to 10.7 per cent. as a maximum. It is proposed to construct only about 3 or 4 miles of sewer at the present time.

PROPOSED SEWAGE TREATMENT PLANT.

In order to comply with the requirements of the State Board of Health, the city of Mt. Vernon proposes to install a sewage treatment plant. The plant is to include a screen chamber; two sedimentation tanks; sludge filters; and contact beds. It is proposed at the present time to install the sedimentation tanks and sludge filters. The effluent from the tanks is to pass directly to the Kokosing River and be disposed of by dilution. It is desired to omit the construction of the contact beds until such a time as the tanks fail to prevent objectional conditions in the river.

The design of the plant provides a nominal capacity of one million gallons per 24 hours, and a population tributary of 10,000.

Site. The proposed location of the sewage treatment plant is in the extreme southeasterly portion of the city and between the C., A. & C. Railroad embankment and the Kokosing River. The plant will be constructed on a tract of land 0.5 acre in area. There is only one house within 1,000 feet of the proposed location. This house is at least 800 feet distant. The C., A. & C. Railroad shops are about 1,200 feet to the northwest. There are 15 houses within 1,500 feet of the proposed site, all located to the north. Should it become necessary to install the contact beds an inverted siphon will be installed beneath the river, in order to carry the effluent from the tanks to beds which are to be located on the southerly side of the river. The site proposed is subject to flood, so that it will be necessary to construct embankments in order to protect the plant against damage. The site is well located and there is little probability of future development in the vicinity.

Overflow and Screen Chamber. The 24-inch main sewer leading from the city enters an overflow chamber which is 12 feet long, 4 feet wide and 2 feet 3 inches deep. The main sewer will be installed on a grade of 0.2 per cent, and when flowing full will discharge 6,280,000 gallons per day. Two openings are provided in the channel in order to by-pass any excess storm water. The openings are placed at an elevation of 5 inches above the bottom of the channel. This depth provides a capacity of approximately 10,000,000 gallons per day, which it will be observed, is considerably in excess of the capacity of the 24-inch main sewer. It will be impossible, therefore, for the overflows to be of service unless both stop planks which control the flow of sewage through the screen chamber are closed. The openings leading to the overflow sewer are 3 feet wide and are to be provided with 2 by 4-inch pieces, which will be placed in grooves in the concrete. The openings are to be provided with screens composed of ⅜-inch round bars spaced 1⅜ inches on centers.

The channel described above discharges directly into the screen chamber, which is constructed on the plan of an elongated octagon. The chamber is provided with a center partition, two screens and two stop planks. A screen and stop plank are placed on either side of the center partition. The screen chamber is 20 feet long and has a width of 7 feet at its greatest section. The screens are each 3 feet 6 inches long and 3 feet high. They are constructed of ⅜-inch by 2-inch iron bars spaced 1⅜ inches on centers. The screens are set at an angle of 70 degrees with the horizontal and are to be cleaned by means of a hand rake. The screenings are to be disposed of by burying. The outlet from the screen chamber is 24 inches in width and allows the sewage to pass from the chamber into a diverting compartment, which is so arranged and provided with stop planks that the two sedimentation tanks may be operated in series, in parallel or independently. The flow through the tanks may be reversed so that the operation is entirely flexible.

Sedimentation Tanks. Two sedimentation tanks of the two-story type are to be included in the proposed installation. The tanks are to be 21 feet 8 inches in depth to the flow line. The sedimentation compartment is 13 feet 8 inches deep, with a cross sectional area of 97.08

square feet. This affords a capacity in each tank of 8,155 cubic feet, or a total sedimentation capacity of 16,310 cubic feet, which is equivalent to 122,325 gallons. Based upon the nominal capacity of the plant, which is 1,000,000 gallons per day, or a population of 10,000, the capacity of the sedimentation compartment provides a period of retention of 2.93 hours. With one tank and the present estimated flow of 200,000 gallons per day, a retention period of 7.35 hours will be obtained.

The sludge compartment is 7.2 feet deep and each tank has a capacity of 6,480 cubic feet, or a combined capacity of 12,960 cubic feet, which is equivalent to 97,200 gallons. Based upon the nominal capacity of the plant and assuming that the sewers will receive nothing but sanitary sewage, the sludge compartment is ample to provide 247 days' retention of sludge. Realizing that a certain amount of storm water will enter through the short lengths of combined sewer which are to be maintained in use, the constant in the formula for the sludge retention period has been changed to 7.25. With this constant the tanks are of sufficient capacity to store the sludge accumulation for 178 days. With one tank in operation and a tributary population of 2,000, during the same constant as in the last case, a sufficient capacity for 447 days sludge accumulation will be provided. It is evident from the above calculations that a sufficient sludge capacity is provided so that practically six months' storage is available at all times.

The bottoms of the sections for the tanks are constructed in the form of an inverted pyramid. The steeper sides are to be placed at an angle of 30 degrees with the horizontal, while the adjacent sides will have an inclination of but 21 degrees with the horizontal. According to the best practice in the design of two-story tanks, this slope is insufficient to provide a ready flow of the sludge, and should be increased to at least a slope of 45 degrees. Independent 8-inch sludge pipes are provided in each section of the tanks. A water line is provided at the plant with connections which will discharge at the inlet to each of the sludge drains. The sedimentation compartment is placed in the center of the tank with the quiescent portions along each side of this central compartment.

Sludge Beds. A sludge bed comprised of four units is to be constructed directly to the west of the tanks. The surface of the beds is shown to be at an elevation of 4 feet below that of the flow line in the tanks. Each unit will be 84 feet by 21 feet in plan, with an area of 1,764 square feet. This provides a total area of 7,056 square feet, or an area of one square foot for each 1.4 persons based upon a population of 10,000. The beds are to be filled with sand and gravel to a depth of 18 inches. No other details are given on the plans as to the method of construction or as to the devices for distributing the sludge and collecting the effluent. In the information blank which accompanied the plans it was stated the underdrains were to be constructed of vitrified sewer pipe. The effluent from both the sludge bed and sedimentation tanks is to be discharged into the Kokosing River and there disposed of by dilution. The outlets will be provided with flap valves to prevent back flow of flood waters.

Connecting Filters. The plans submitted by the consulting engineer show the general layout for contact filters which are to be constructed whenever the necessity arises, on the southerly bank of the Kokosing River immediately opposite the sedimentation tanks. The effluent from the tanks will be conducted across the river by means of an inverted siphon. The contact filters will be divided into eight units, each 100 feet square. The installation of the contact filters is to be omitted at the present time, since it is believed that a sufficient quantity of water is available at all times in the Kokosing River to properly dilute the sedimentation tank effluent.

Kokosing River. The Kokosing River, which is to receive the effluent from the sewage treatment plant, has a watershed area above Mt. Vernon of about 250 square miles. It passes through rather hilly country and its flow following storms fluctuates quite rapidly. No gaugings have been made by the State Board of Health in order to determine the minimum or average dry weather flow. The consulting engineer, however, has had measurements made on two different occasions, at which times it was believed that the river was at low stage. The flow was observed to be from 115 to 123 second feet. A rough measurement of the flow was made by a representative of the State Board of Health on July 5, 1912, at which time indications were that the flow was not in excess of 50 second feet. Based upon the character of the watershed and the flow of similar streams in Ohio, the estimated minimum flow is 15 second feet, providing a dilution of 1.5 second feet per thousand population with 10,000 tributary to the sewers.

Above Mt. Vernon the Kokosing River receives no sewage pollution. Below the city are located Gambier and Howard, at distances by the river of 6 and 13 miles, respectively. The first community of any size is Coshocton, located at the confluence of the Walhonding and Tuscarawas Rivers, 36 miles below Mt. Vernoon. The nearest public water supply is at Zanesville, where the raw water from the Muskingum River is used. The effect of the discharge of the effluent from the sewage treatment works at Mt. Vernon will be negligible as far as any serious pollution of the Zanesville water supply is concerned. The plant will probably prevent any localized nuisance caused by the discharge of sewage into the river.

SUMMARY.

On July 15 and 17, 1913, plans were received from R. W. Pratt, of Cleveland, consulting engineer for Mt. Vernon, which show a proposed sewerage system, including both sewers and a sewage treatment plant. The sewers are to be constructed on the separate plan. The plans show a total length of approximately 14 miles. The sewage treatment plant is to consist of a screen chamber; sedimentation tanks; and sludge bed of sufficient capacity to treat the sewage from 10,000 persons, or a sewage flow of one million gallons per day. An overflow is provided at the entrance to the plant in order to divert any excess flow directly to the river. The elevation of the bottom of the overflow is so high above the bottom of the channel that it is not likely that it will ever come automatically into use. The bottoms of the compartments of the sedimentation tanks are not placed at sufficient inclination with the horizontal so as to insure a free flow of sludge to the sludge outlets. The general design of the plant is satisfactory and it is probable that the clarified effluent from the sedimentation tanks will not create objectionable conditions in the Kokosing River.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, the plans for proposed additional sewerage and sewage treatment works for Mt. Vernon, received from Mr. R. Winthrop Pratt, consulting engineer, July 15 and 17, 1913, were approved subject to the following conditions:

1st. That the proposed sedimentation tanks and sludge filters shall be installed and ready for operation before connections with additional sewers shall have been made; and that secondary treatment of the sewage, satisfactory to the State Board of Health, shall be provided at such time as the tanks shall fail to produce an effluent properly disposed of by dilution in the Kokosing River;

2nd. That the city shall appoint an official to have general charge of the maintenance of the proposed sewers and sewage treatment works;

3rd. That the city council shall pass an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers, and providing for the discontinuance and removal of existing connections in violation of the provisions of the said ordinance; and,

4th. That this approval shall be void unless contracts for the installation of additional sewerage and sewage treatment works shall have been awarded prior to April 1, 1914.

REPORT ON PROPOSED SEWAGE TREATMENT PLANTS FOR THE GRANT STREET AND STEVENS STREET SCHOOL BUILDINGS AT NEWARK.

On August 27, 1913, plans and specifications were received from Mr. Vernon Redding, architect, for proposed sewage treatment plants at the

Grant Street and the Stevens Street school buildings in Newark. These plans were referred to the engineering department for examination. On July 28, 1913, prior to the submission of the plans the writer visited Newark and investigated the proposed methods of disposal of the sewage from the school buildings. The following report was submitted:

On August 13, 1913, a report was made on an inspection of the school buildings and the necessity for some method of sewage disposal. It is now proposed to construct the sewage treatment plants in the yards of the respective school buildings. These plants will be entirely subsurface, with concrete roofs, to be covered with approximately 18 inches of soil. Access to the plants will be gained through manholes.

Each plant will consist of a septic tank, dosing chamber and intermittent sand filters in two units.

GRANT STREET SCHOOL.

The sewage flow per pupil per day has been calculated on the following basis:

10-Room School. 400 Pupils.	*Capacity.*
2 Latrine tanks, 7 gallons each, 6 flushes per hour. 4 x 7 x 6 x 6 hours.	1,008 gals.
16 Urinal stalls, 5 gallons each, per hour. 16 x 5 x 6 hours............	480 gals.
6 Drinking fountains and sink combinations @ 10 gallons per hour. 6 x 10 x 6 hours..	360 gals.
2 Individual water closets @ 15 gallons per hour. 2 x 15 x 6 hours....	180 gals.
3 Lavatories @ 5 gallons per hour. 3 x 5 x 6 hours.................	90 gals.
Total for 400 pupils....................................	2,118 gals.

On this basis 6 gallons per pupil per day have been assumed as the sewage flow.

Septic Tank. The septic tank will be of concrete construction, with 6-inch roof, 8-inch walls and 4-inch bottom. The flow line of the tank is 6 feet below the surface of the ground. In the center of the tank hanging across the direction of flow is a cast iron baffle plate, constructed of four separate pieces. It extends 2 feet 6 inches below the flow line and 6 inches above. There is a 24-inch manhole with a cast iron cover. This manhole cover should be perforated in order to allow for ventilation, as no other provision for ventilation is made. The bottom of the tank is constructed with a sump about 6 inches deep which will allow for adequate cleaning of the tank by means of a pump which can be lowered through the manhole which is placed over the inlet to the tank. The septic tank is 8x10 feet in plan and 10$\frac{1}{2}$ feet deep, 6 feet deep below the flow line, giving a head room of 4$\frac{1}{2}$ feet. The capacity is 480 cubic feet or 3,600 gallons. For 400 pupils, on the basis of 6 gallons per pupil per day, the sewage flow will be 2,400 gallons per day, which will actually enter the tank in six hours. The period in the tank will be a day and a half. The inlet and outlet are constructed of 6-inch vitrified pipe, properly trapped to make difficult the generation of currents, the escape of gases, and of sludge to the dosing chamber. In the calculation of the septic tank the designer has provided for 3,600 gallons of sewage per day or a 50 per cent excess on the amount as calculated on the basis of 6 gallons per pupil per day. No allowance for this 50 per cent excess has been made, however, in the calculation of the filters.

Dosing Chamber. The dosing chamber is of concrete construction, rectangular in plan, 13x8 feet, is 6½ feet deep, 2 feet below the flow line, giving 4½ feet of head room. It is separated from the septic tank by an 8-inch plain concrete wall. In this wall there is placed a 12x12-inch air passage to the septic tank to allow for ventilation. A 24-inch manhole is provided over the two automatic siphons, which will allow of easy access to the chamber. The capacity of the chamber is 208 cubic feet or 1,560 gallons. It will be provided with two Miller (or equivalent) siphons, alternate dosing to be controlled by hand from 4-inch gate valves, easily accessible from the manhole. On the basis of 2,400 gallons per day, there will be approximately 1.5 trippings per day or one every four hours during the school session, leaving the chamber one-half full on alternate days and week ends.

Filters. There are two filter units, 44x22½ feet in plan and 11½ feet deep. The depth of filtering material is 3 feet, which gives a head room of 8½ feet. The area on the two filters is 2,025 square feet, which with deductions for the roof columns will allow about 1,000 square feet per unit. The filter is constructed with concrete walls, floor and roof. The dividing walls between the two units is 8 inches thick, of plain concrete. It protrudes 12 inches above the surface of the sand, allowing free access and ventilation between the filters.

The filtering material is to consist of sand, gravel or cinders to pass a ⅜-inch screen. It is to be placed 3 feet deep or 2½ feet above the 6-inch tile underdrain. The distribution trough consists of 4-inch vitrified pipe, with double Y openings on concrete slabs. The distribtuion system is adequately designed and should give satisfactory results. The depth of flooding at one dose from the dosing chamber will be approximately 2 inches. On the basis of 2,400 gallons from the 400 pupils, the following rates will be maintained on the filters:

	ONE FILTER.		TWO FILTERS.	
Rates.	*Rate Per 24 Hrs.*	*Rate Per 6 Hrs.*	*Rate Per 24 Hrs.*	*Rate Per 6 Hrs.*
Gallons per acre per day.........	418,000	104,500	209,000	52,250
Gallons per acre foot per day....	139,333	34,833	69,667	17,400
Gallons per cubic yard per day...	88	22	44	11

In order to prevent over-dosing in one bed, the siphon should be arranged to dose alternately and automatically.

The underdrainage consists of two parallel lines of 6-inch field tile under each bed. The joints in the tile are covered by half tiles to prevent clogging by sand. There is no slope given to these underdrains. The head of the underdrain rises 12 inches above the surface of the filtering material, and should consist of vitrified tile with calked joints, to prevent the escape of unfiltered sewage. Ventilation is provided by means of two vent pipes in the roof of the filter.

STEVENS STREET SCHOOL.

There are 160 pupils to be cared for in the Stevens Street school. On the basis of 6 gallons per pupil per day, the sewage flow will be 960 gallons in six hours. The general features of the plant are identical with the Grant Street school, the variations being only in size of the units.

Septic Tank. The septic tank is 8x6 feet in plan, with a depth of 7½ feet. The depth below the flow line is 4 feet, giving a head room of 3½ feet. The capacity of the tank is 1,440 gallons, giving a period of 1½ days.

Dosing Chamber. The dosing chamber is 6x8 feet in plan, with a depth of 1½ feet below the flow line and a head room of 3½ feet above, having a capacity of 540 gallons. There will be 1.8 trips per day or every 3.4 hours.

Filters. The two units are 30 feet 4 inches x 14 feet in plan. The total area is 844 square feet, or 422 square feet per unit. The rates will be as follows:

	ONE FILTER.		TWO FILTERS.	
Rates.	*Rate Per 24 Hrs.*	*Rate Per 6 Hrs.*	*Rate Per 24 Hrs.*	*Rate Per 6 Hrs.*
Gallons per acre per day.........	400,000	100,000	200,000	50,000
Gallons per acre foot per day....	133,333	33,333	66,667	16,667
Gallons per cubic yard per day...	80	20	40	10

SUMMARY AND CONCLUSIONS.

At the Grant Street and the Stevens Street school buildings there are to be constructed sewage treatment plants entirely under the ground. The basis of flow has been placed at 6 gallons per pupil per day, after detailed study of the effluent from the various plumbing devices in the building. The septic tanks have been given a period of 1½ days, and are larger than necessary but no serious difficulty should arise from this condition, except that the effluent to be treated on the filters will be quite stale and may not give satisfactory results. The dosing chamber provided with two Miller siphons should be arranged for automatic alternating of the action of these siphons, instead of hand control as now shown. During the time of action, the filters will be overdosed, but on the basis of the dose in 24 hours the area provided is sufficient. No ventilation is shown for the septic tanks and dosing chamber, and insufficient ventilation for the filters. The underdrains which rise above the surface of the filtering material should be constructed of vitrified pipe with cemented joints. The loss of head through the plant will be 3 feet, which will allow no slope for the underdrains. The filtering material is to consist of sand, gravel or cinders, to pass a ⅜-inch mesh screen and should be submitted to the State Board of Health for approval.

ACTION.

Under date of September 11, 1913, the Secretary of the State Board of Health approved the plans for sewage treatment for the Grant Street School and the Stevens Street School at Newark, received August 27, 1913, from Mr. Vernon Redding, architect, subject to the following conditions:

1st. That direct ventilation of the septic tanks, dosing chamber and filter chambers shall be provided by connection to the main ventilation stacks of the respective school buildings;

2nd. That double automatic alternating siphons be substituted for hand controlled siphons;

3rd. That sand having an effective size of 0.4 to 0.6 m. m. and a uniformity co-efficient of not more than 2.0 shall be used as a filtering medium, and that samples of the sand to be used shall be approved by the Engineer of the State Board of Health before being placed;

4th. That the ventilators for the underdrains of the filters shall be of iron pipe and shall extend at least 12 inches above the surface of the sand;

5th. That the board of education of the city of Newark shall employ a competent caretaker to attend to the operation of the proposed plants;

6th. That the proposed sewage treatment plants shall be abandoned and removed as soon as a sanitary sewer shall have become available for the removal of the sewage from the school buildings; and,

7th. That this approval shall be void unless the proposed sewage treatment plants shall have been constructed prior to June 1, 1914.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR NEWBURGH HEIGHTS.

On February 5 and 14, 1913, plans for proposed additional sewerage for Newburgh Heights were received from Mr. Ralph Hecker, engineer for the village. The plans were referred to the engineering department and on March 5, 1913, one of the assistant engineers visited Newburgh Heights and investigated the proposed improvement. The following report was submitted:

Newburgh Heights is a village with a population of about 1,000, located in Cuyahoga County immediately south of and contiguous to the city of Cleveland and a short distance east of the Cuyahoga River. The village is located upon elevated ground dissected by ravines formed by Burke Brook and the south branch of that stream. The village is supplied with water from the city of Cleveland and has installed a partial system of combined sewers. No plans for the existing sewers were submitted to the State Board of Health for approval prior to their installation.

EXISTING SEWERAGE.

Practically all of the existing sewers have been built on the combined plan. The principal portion of the sewage is discharged through an outlet into Burke Brook at a point immediately north of the northerly corporation line of the village within the city of Cleveland. Below the point of outlet Burke Brook flows in a northwesterly direction about one mile to the Cuyahoga River. A relatively large quantity of sewage sufficient to seriously pollute Burke Brook during dry weather is discharged at the outlet. Its effect upon the stream is, however, minimized by the presence in the stream of large quantities of acid iron wastes discharged from the plant of The Cleveland Sheet and Tin Plate Company, within the city. A portion of the sewerage of the easterly part of the village is connected to the Cleveland sewers by a cast iron pipe line crossing Burke Brook supported upon a highway bridge.

PROPOSED ADDITIONAL SEWERAGE.

The plans of the engineer provide for the installation of combined sewers to drain and furnish sewerage facilities for an area of fourteen acres in the easterly portion of the village. The construction of the proposed sewers is necessitated primarily to prepare several streets for improvement, but it is thought that the sewers will also be used to a considerable extent to receive domestic wastes. The plans provide for some 2,000 feet of sewers tributary to an outlet into the south fork of Burke Brook at Harvard Avenue. This tributary enters the main stream about 1½ miles below the point of outlet. It is in a deep ravine which secludes it from habitations. At a point above the proposed outlet the stream already receives wastes from a slag crushing plant of The Cleveland Steel Company and the stream is polluted by this means. The visible effect of the sewage pollution will, therefore, be reduced. However, in view of the fact that the flow of the stream is from a watershed area of less than one mile, it is probable that the addition of sewage will increase the nuisance.

CONTEMPLATED IMPROVEMENTS BY CLEVELAND.

The city of Cleveland is at the present time preparing plans for the construction of an intercepting sewer to follow the valley of the Cuyahoga River in an upstream direction and collect the sewage now discharged into the river. The probable line of this interceptor will pass within a short distance of the confluence of Burke Brook with the south fork, and the sewer will terminate at a site for treatment works in the extreme southerly portion of Newburgh Heights. The installation of this interceptor will furnish adequate means of disposal of sewage for Newburgh Heights. Owing to the topographical conditions and also to the rapid development of the district, the installation of sewage treatment works for the village will probably introduce great difficulties. A connection with the Cleveland interceptor is, therefore, the advisable solution.

ACTION OF THE BOARD.

At a meeting held March 20, 1913, the State Board of Health approved the plans for proposed additional sewerage for Newburgh Heights, submitted by Mr. Ralph Hecker, engineer for the village, February 5 and 14, 1913, subject to the following conditions:

1st. That the proposed sewer shall be utilized only for the removal of storm water and shall not be used to receive sewage or other offensive wastes until one of the following conditions shall have been met:

a. Connection of the proposed sewers to the contemplated intercepting sewer of the city of Cleveland.

b. Contract with the city of Cleveland for connection with the intercepting sewer when completed, and the construction of temporary sewage treatment works following the signing of such a contract; such works to be abandoned immediately after connection with the Cleveland intercepting sewer has been made.

c. Construction of permanent sewage treatment works in event of failure of the city of Cleveland to construct the contemplated intercepting sewer or in event of failure of the village to effect a contract with the city for connection to the intercepting sewer.

2nd. That the village council pass an ordinance satisfactory to the Secretary of the State Board of Health prohibiting the use of the proposed sewers for sanitary purposes, until such use has been approved by the State Board of Health following the carrying out of one of the three conditions above mentioned.

REPORT ON PROPOSED NEW SEWAGE TREATMENT PLANT FOR NEW PHILADELPHIA.

On August 12, 1913, plans for a proposed new sewage treatment plant for New Philadelphia were received from Mr. George E. Arnold, city engineer. The plans were referred to the engineering department and on August 13, 1913, the Chief Engineer visited New Philadelphia and investigated the proposed improvement. The following report was submitted:

New Philadelphia, a city with a population of 9,200, is located in Tuscarawas County on the Tuscarawas River. The main portion of the city lies upon elevated ground east of the river, at an elevation of 50 feet above the level of the stream. The water supply is obtained from driven wells in the valley of the river. The sewerage system has been inadequate in the past but the city is now engaged in completing a comprehensive system of sewers.

PAST ACTIONS OF THE STATE BOARD OF HEALTH.

In November 1907 plans for improvement of the sewerage system and the installation of a sewage treatment works were approved by the State Board of Health. These plans provided for a plant comprising septic tanks and intermittent sand filters. These plans were not carried out.

In 1908 the local board of health petitioned the State Board of Health under section 1249 of the General Code, to investigate the conditions attending the disposal of sewage and to order the city to abandon the existing sewer outlets. Following an investigation by the State Board of Health the local board of health withdrew its former petition and no further action was taken to compel the city to improve conditions.

In January, 1911, the State Board of Health considered plans for sewerage improvements, and a sewage treatment plant, submitted with a request for approval of the construction of sewers in advance of the treatment works. This request was denied by the Board and later, in March 1911, the plans were again submitted and approved by the Board. These plans included sewage treatment works, consisting of septic tanks and intermittent sand filters.

Since this approval was granted the city has proceeded with the installation of sewerage and has practically completed the system. No steps have been taken, however, to construct a sewage treatment plant. Very few connections to the sewers have been permitted as it has been the desire of the city officials to provide a treatment plant before the new sewers are used.

EXISTING SEWERAGE.

The first sewers at New Philadelphia were installed about twenty-five years ago. The early sewers were constructed on the combined plan and two outlets in the southwesterly portion of the city were installed. For the past few years the work of installing a comprehensive system of sanitary sewers has been in progress and at the present time the sewerage system has been practically completed. A trunk sewer varying in size from 8 to 48 inches in diameter extends from the northerly portion of the city to the southeasterly portion of the city, a length of about two miles. The lower portion of this sewer is an existing combined sewer and will be retained to remove both storm water and sewage. A short distance above the existing outlet, which will continue in use to discharge storm water, the dry weather flow will be diverted to a 14-inch cast iron siphon, which will convey the sewage to the treatment plant. The siphon is 3,600 feet in length and extends along the easterly side of the river to the site of the treatment works, which is located about one-half mile southeast of the city. The siphon has an hydraulic grade of .34 per cent and will have a velocity of 2.8 feet per second. Its capacity is 1.95 million gallons per 24 hours. The siphon has been installed but will not be used until the treatment plant has been completed.

PROPOSED SEWAGE TREATMENT PLANT.

The plans for treatment of the sewage provide as the main features, a screen chamber, sedimentation tanks, sludge filters and contact filters. The plant, as a whole, is designed for a population of 12,000, or a sewage flow of 1,200,000 gallons per day. The maximum flow which will reach the plant is 1.95 million gallons per day, the capacity of the siphon. It is proposed to construct the screen chamber, tanks and sludge filters and to omit, for the present, the construction of the contact filters.

Site. The proposed location for the sewage treatment plant is a tract in the valley of the Tuscarawas River lying east of the river between the stream and the right of way of the Baltimore and Ohio Railroad. It is very satisfactorily located as regards habitations, as there are no dwellings or other buildings within one-fourth mile. During extreme high stages of the river the site is flooded to a depth of five feet or more and to protect the plant a levee will be provided. The tanks will be placed near the railroad at the highest elevation of the site and the contact filters will be on slightly lower ground nearer the river.

Screen Chamber. The inverted siphon discharges into a screen chamber located at the inlet ends of the sedimentation tanks. The screen chamber is an open concrete structure about 7.5 feet in width and 10 feet in length. It is divided longitudinally into two compartments, each discharging into one of the tanks. Two bar screens set vertically are provided in each compartment. Stop planks may be used to control the operation of either compartment or tank.

Sedimentation Tanks. The screened sewage enters two sedimentation tanks of the two-story type. These are reinforced concrete structures, each 60 feet by 21 feet in plan and 22.5 feet in depth from the flow line to the sludge wells. The tanks will be provided with wooden covers, although concrete is shown on the plans. They will set end to end and the design provides that the flow leaving the screen chamber will pass longitudinally through one side of the tank reversing its direction and returning along the other side. The sedimentation chamber in each tank has a capacity of 8,940 cubic feet, or 67,000 gallons. The total period for sedimentation afforded is, therefore, 2.68 hours, with a sewage flow of

1.2 million gallons. With a maximum sewage flow. the period of retention will be 1.65 hours. It is probable that better sedimentation efficiency would be obtained with tanks furnishing a four-hour period of flow. The normal velocity of flow will be 0.75 foot per minute. The sludge compartments have a total capacity of 7,000 cubic feet, which is sufficient to provide a period of storage of eleven days with a population tributary of 12,000. The sludge will be removed at intervals under a static head of three feet through sludge pipes leading from the bottom of the wells.

Sludge Filters. Two sludge filters, each divided into three units are provided in the design. The total area is 6,092 square feet, which will serve a population of 18,000. The filtering material comprises two feet of sand. The surrounding and division walls are of plain concrete construction.

Contact Filters. The contact filters are arranged in two groups of four units each. The units are 88 feet square and have a depth of filtering material of five feet. The surrounding and division walls and floors are of concrete construction. The holding capacity of each unit is 96,700 gallons and the cycle of operation will, therefore, be 15.5 hours. The total area is 1.44 acres providing a rate per acre of about 843,750 gallons. The rate per acre foot is 168,500 gallons and per cubic yard is 105 gallons. It will be noted that rather high rates of operation are provided. Each group of contact filters is equipped with automatic filling and discharging apparatus, which will control the operation of the filters. The settled sewage will be applied through vitrified sewer pipe distributors laid just below the surface of the filtering material and the effluent will be removed by an underdrainage system of half tile laid on the concrete floor of the filters. The effluent will be discharged into the Tuscarawas River one foot above mean low water elevation.

Disposal of Effluent. Above New Philadelphia the Tuscarawas River has a watershed area of 1,450 square miles, upon which there is a population of about 130 per square mile. Immediately above New Philadelphia the stream receives sewage from Canal Dover, a city with a population of 7,000. Plans have been prepared for a sewage treatment plant for this city. No accurate flow measurements are available by which the discharge of the river may be known. Judging from the size and character of its watershed and upon the assumption that the minimum dry weather flow is 0.05 second feet per square mile of watershed area the minimum flow is 72.5 second feet. This flow is sufficient to properly dilute the sewage from 17,000 persons, if satisfactory dispersion is provided. It is apparent that the flow of the river even during dry weather is a factor of importance in the disposal of the sewage of New Philadelphia. The Tuscarawas River flows 45 miles to its confluence with the Walhonding River, where the Muskingum River is formed. The nearest water supply is at Zanesville, 73 miles below New Philadelphia. where the Muskingum River water is used without treatment. It is probable that a new water supply or a water purification plant will be installed at Zanesville within a few years. However, the existence of this supply should be recognized and bacterial purity of the effluent from the proposed sewage treatment plant should be demanded.

The assumed minimum flow of the Tuscarawas River of 70 cubic feet per second is ample to properly dilute a well clarified effluent from a sedimentation tank serving a population of 12,000. The pollution of the stream above New Philadelphia is a factor to be considered and inasmuch as Canal Dover is immediately above, the combined population of the two cities should serve as a basis for computation. The sewage from Canal Dover is discharged into the river some four miles above the proposed sewage treatment works for New Philadelphia and in this distance the stream, no doubt, recovers its oxygen content to a great extent. Upon the basis that two cubic feet per second per thousand population is required for the dilution of an effluent from a sedimentation tank of the type proposed, the minimum flow of the river is sufficient to dilute the sewage from a population of 35,000. In order to utilize the flow of the stream, however, a properly constructed outlet to secure dispersion should be provided. Bacterial purity of the effluent from the tanks should be secured by disinfection.

SUMMARY.

The sewage system of New Philadelphia has been practically completed and it is now proposed to install a sewage treatment plant. It is proposed to install sedimentation tanks to clarify the sewage prior to disposing of it by dilution in the Tuscarawas River. Contact fillers are included in the design and will be installed for secondary treatment if required in the future. The assumed minimum flow of the Tuscarawas River is ample to dilute the sewage effluent satisfactorily and the mean summer flow is greatly in excess of that required. Better clarification of the sewage in a somewhat larger tank, disinfection of the effluent, and dispersion in the river should be required. With these revisions the plant should produce satisfactory results.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held September 2, 1913, the plans for a proposed sewage treatment plant for New Philadelphia, received August 12, 1913, from Mr. George A. Arnold, city engineer, were approved subject to the following conditions:

1st: That the contact filters, as shown on the plans, may be temporarily omitted, and that these devices shall be installed when deemed necessary by the State Board of Health;

2nd. That the design of the sedimentation tanks shall be revised in a manner satisfactory to the State Board of Health to provide a period of flow of at least four hours;

3rd. That apparatus for the disinfection of the effluent from the sedimentation tanks shall be provided;

4th. That an outlet of special construction to secure good dispersion of the effluent in the Tuscarawas River shall be installed;

5th. That a competent person shall be employed to attend to the operation of the proposed sewage treatment plant; and,

6th. That this approval shall be void unless revised plans conforming to the foregoing conditions of approval shall have been submitted to the State Board of Health prior to January 1, 1914, and unless contracts for the installation of a sewage treatment plant shall have been awarded prior to May 1, 1914.

REPORT ON PROPOSED STORM SEWER FOR NEW STRAITSVILLE.

On September 11, 1913, a plan and profile for a proposed storm sewer for New Straitsville were received from Mr. H. L. Maddocks, engineer for the village. On October 8, 1913, a request for approval of the plan was received from Mr. Dan Callahan, village clerk. The plan was referred to the Engineering Department and on September 22, 1913, the principal assistant engineer visited New Straitsville, examined the proposed improvements and conferred with the village council. The following report was submitted:

New Straitsville, a village with a population of about 2,250, is located in the extreme southerly portion of Perry County on a small tributary of Monday Creek, which enters the Hocking River at Nelsonville. The village is at present not provided with public improvements and its general sanitary condition is much neglected. Similar to other villages in this section of the state, New Straitsville is essentially a residence community for mine workers and oil well operators. The topography within the village and surrounding locality is hilly. The drainage from the village reaches a small stream which flows in a general westerly direction through the southerly portion of the community. The main street of the village is north and parallels this watercourse and is separated from it by the yards of the Hocking Valley Railroad. Extremely objectionable conditions are caused along this main thoroughfare by the discharge into the city's gutters of sewage and other wastes from buildings. It is proposed to pave this main street and incidentally to install a storm sewer to furnish drainage. At the present time the gutter drainage enters a catch basin between Van Heyde and Clark Streets from which an outlet extends to a point immediately south of the street where it discharges into a ditch leading to the stream.

Proposed Sewerage. The plans provide for the installation of some

1,500 feet of vitrified pipe sewer having a diameter of 15 inches and 24 inches and extending along the main street (Railroad Street) of the village. The existing outlet between Van Heyde and Clark Streets will be abandoned and a new outlet is proposed between Wiley and Davis Streets in the westerly portion of the village. Two other short sewers receiving surface drainage through catch basins at Clark Street and Martin Street in the central portion of the village are also proposed. These will discharge through independent outlets carried under the tracks of the Hocking Valley Railroad.

Relative to the use of the proposed sewer it appears to be the intention to permit connections from buildings along the main street for the purpose of removal of sanitary wastes. While such practice would undoubtedly tend to improve the sanitary conditions within the village itself, the use of the storm sewer in this manner is not advisable. The small stream into which the proposed sewer will discharge has an intermittent flow and during dry weather the discharge of sanitary wastes even in small amount would no doubt result in a decided nuisance.

In a communication dated September 12, 1913, the mayor and council of the village were advised to have prepared proper plans for a complete system of sanitary sewers for the village, and to install that portion of the system included in the streets to be paved. It is evident that unless proper sanitary sewers are provided, a nuisance will result from the misuse of the storm sewers.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held October 15, 1913, this plan and profile for a proposed storm sewer for New Straitsville, received from Mr. H. L. Maddocks, engineer for the village, September 11, 1913, were approved subject to the following conditions:

1st. That the proposed sewer shall be used strictly as a storm water sewer and that no sanitary wastes shall be permitted to be discharged therein; and,

2nd. That this approval shall be void after December 1, 1913, unless the village council shall have enacted, prior to that date, an ordinance to be previously approved by the Secretary of the State Board of Health regulating the use of connections to the proposed sewer.

The Mayor and Council were advised as follows:

"The construction of the proposed storm sewer should not have been undertaken until the plans had been submitted to and approved by the State Board of Health as provided by law. The installation of a storm sewer without provision of a sanitary sewer for the removal of sewage is not advisable. Ultimately a complete system of sanitary sewers for the village will be required and a sewage treatment plant will be necessary to prevent a nuisance. In the interest of economy, as well as improved sanitation, plans for a comprehensive system of sanitary sewers for the village should be secured, and that portion of the system extending along Railroad Street should be installed prior to the paving of that street."

PROPOSED SEWERAGE FOR OAK HARBOR.

At a meeting of the State Board of Health held March 20, 1913, Mr. Louis Hilb, mayor of Oak Harbor, presented a verbal request that the Board amend its approval of proposed sewerage for the village, granted March 21, 1912, to permit the village to proceed with the construction of the outlet sewer before having prepared full detailed plans of the proposed sewerage system. It was stated that the village was financially unable to construct the trunk sewer and to prepare the required plans. Previous to the submission of this request, a plan and profile of a proposed main sanitary sewer for Oak Harbor was received from Mr. George C. Champe, consulting engineer, March 3, 1913.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held March 20, 1913, the plan and profile, submitted by Mr. George Champe, consulting engineer, March 3, 1913, for a proposed main sanitary sewer for Oak Harbor, to extend from the intersection of Erie and Portage Streets to a submerged temporary outlet into the Portage River some 2,750 feet east of the Locust Street bridge, was approved subject to the following conditions:

1st. That a purification plant of a design satisfactory to the State Board of Health be installed when in the opinion of said Board such becomes necessary;

2nd. That detailed plans of the sewerage system, including manholes, flush tanks, grades, sizes and methods of ventilation of the sewers; and location and construction of the outlet be submitted to and receive the approval of the State Board of Health;

3rd. That this approval be void unless contracts for construction of the proposed main sanitary sewer shall have been awarded prior to September 1, 1913, and detailed plans, to comply with the foregoing second condition of approval, shall have been submitted prior to January 1, 1914.

REPORT ON PROPOSED ADDITIONAL SEWERAGE FOR PORT CLINTON.

On June 7, 1913, plans and specifications for proposed additional sewerage for Port Clinton were received from Mr. C. E. DeWitt, village engineer. The plans were referred to the engineering department and on June 18, 1913, the principal assistant engineer visited port Clinton and investigated the proposed improvement. After an examination of the plans the following report was submitted:

Port Clinton, a village with a population of 3,000, is located in Ottawa County on the shore of Lake Erie, at the mouth of the Portage River. The water supply is obtained from Lake Erie, being pumped through an intake 1,600 feet from the shore and 1,000 feet west of a breakwater pier extending from the mouth of the Portage River into the lake. The supply is purified by a rapid sand filter plant. An emergency intake to draw water from the Portage River is also maintained.

Existing Sewerage. The sewerage of the village covers practically the entire built up area. The sewers have been constructed at various times and in no case has the State Board of Health been requested to grant approval of proposed sewers. All of the sewers are used for the removal of both storm water and sewage. The outlets are located along the south bank of the Portage River and the shore of Lake Erie. Six sewers discharge into the river and three discharge into Lake Erie east of the mouth of the river.

The discharge of sewage into the Portage River is not attended by a nuisance as the dry weather flow of the stream is sufficient to dilute the sewage beyond the state of putrefaction. The watershed area of the stream is 675 square miles and the estimated minimum flow 25 cubic feet per second. The direction of flow is influenced by the level of Lake Erie and at times there results an up-stream velocity. With the subsequent lowering of the lake the river channel is flushed by the relatively rapid flow. The discharge of the Portage River into Lake Erie follows a course dependent upon the direction and velocity of the wind. With an easterly or northeasterly wind the river water is carried to the water works intake and the water supply of the city is endangered by the sewage from the village. Several investigations of the State Board of Health have shown the influence of the discharge of the Portage River upon the raw water obtained from Lake Erie, and it is reasonable to suppose that the raw water is rather frequently contaminated in this manner.

The sewage discharged into Lake Erie east of the mouth of the Portage River has caused considerable complaint due to shore nuisances. Although the outlets are carried to distances reaching 600 feet from the shore, the sewage is not properly dispersed. The lake at this point is very shallow and is rapidly becoming filled due to influences of the breakwaters at the mouth of the Portage River. The growth of vegetation also interferes with the movement of the lake waters, which would assist dispersion, and at times there results an excessive pollution near the sewer outlets.

Proposed Additional Sewerage. The plans of the village engineer provide for the construction of a combined sewer in Jefferson Street extending from the southerly portion of the village to an outlet into the Portage River. The sewer will replace an existing sewer which is inadequate to supply drainage. The proposed new sewer will have a length of about 2,900 feet and will be constructed of vitrified pipe 20 by 30 inches in diameter. Its grade will be sufficient to provide a self-cleansing velocity. It will serve a population of about 300 and will drain an area of about 31 acres. The inadequacy of the existing sewer causes insanitary conditions in the southerly portion of the district due to flooding of the surface and the retention of sewage in cellars. The proposed outlet into the Portage River is at the foot of Jefferson Street near the point at which the Portage River discharged into Lake Erie prior to the construction of the breakwaters. The proposed outlet is within 100 feet of the emergency water supply intake above mentioned. At no great additional expense it would be possible to carry the proposed sewer to an outlet into Lake Erie east of the mouth of the Portage River.

Past Actions of the State Board of Health. In January 1913, the Board considered a report of its engineer upon an investigation of sewerage conditions at Port Clinton. At this time it was found that several miles of combined sewers had been constructed without the approval of the State Board of Health; that the discharge of sewage into the Portage River brought about a contamination of the water supply of the village; and that the discharge of sewage into Lake Erie east of the Portage River caused a nuisance in the lake. The village authorities were notified that the Board would require that the problem of sewerage be studied by a competent sanitary engineer with a view to improving the existing unsatisfactory conditions. Subsequent to this action of the State Board of Health the village has failed to comply with the Board's requirement.

SUMMARY.

The village of Port Clinton proposes to install additional sewerage with a discharge into the Portage River. Previous investigations have shown that the pollution of the Portage River affects the water supply of the village and that the discharge of sewage into Lake Erie east of the Portage River creates a nuisance. The village has failed to comply with the Board's requirement that the problem of sewage disposal be studied by a competent sanitary engineer and has taken no steps to improve the present unsatisfactory conditions.

The proposed additional sewerage will provide drainage in a district which is now unsatisfactorily drained, and it will, therefore, improve the sanitation of that district. It is important, therefore, that the sewer be constructed at an early date. The discharge of sewage into the Portage River should, however, not be permitted. As a temporary expedient an outlet into Lake Erie east of the Portage River would serve to prevent the pollution of the water supply from the proposed sewer. Permanent improvement as regards the disposal of sewage from the entire village is required. This may be secured by the construction of an intercepting sewer with sewage treatment works or proper disposal of the sewage by dilution at a satisfactory point.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, the plans and specifications for proposed additional sewerage in Jefferson Street, Port Clinton, received from Mr. C. E. DeWitt, village engineer, June 7, 1913, were approved subject to the following conditions:

1st. That the proposed sewer shall not discharge into the Portage River and that a temporary outlet into Lake Erie east of the Portage River shall be established;

2nd. That complete detail plans providing for the collection at one point and proper disposal of the sewage from the entire village shall be submitted to the State Board of Health; and,

3rd. That this approval shall be void unless plans complying with the foregoing first condition of approval shall have been submitted prior to September 1, 1913; and unless plans complying with the foregoing second condition shall have been submitted prior to January 1, 1914; and unless proper disposal of the sewage of the village shall have been provided prior to January 1, 1915.

The mayor and council were addressed as follows: "The discharge of sewage into the Portage River is a menace to the quality of the water supply of the village and the discharge of sewage into Lake Erie east of the Portage River creates a nuisance. In granting conditional approval of the proposed additional sewerage with a temporary outlet into Lake Erie, the Board recognizes the necessity of providing adequate drainage for the district to be sewered but will insist that proper measures be taken to prevent the contamination of the water supply and the creation of a nuisance in Lake Erie. An expert should be employed to devise a satisfactory and economical remedy for the present insanitary conditions."

REPORT ON PROPOSED SEWERAGE FOR RIPLEY.

On July 30, 1913, a communication was received form Mr. D. W. Lemon, village clerk of Ripley, embodying a recent action of the local council ordering that a plan prepared in 1898 by Mr. E. F. Layman of Cincinnati, engineer for the village, for proposed sewerage be submitted to the State Board of Health for approval. Following the receipt of the plans the principal assistant engineer visited Ripley August 14, 1913, for the purpose of making a general investigation relative to the proposed improvement. The purpose of the visit was facilitated by the assistance of Mr. L. V. Williams, Mayor. The following report was submitted:

The village of Ripley is located in Brown County on the Ohio

River, 50 miles above the city of Cincinnati, and 60 miles below Portsmouth. The population, based on the last census report is 1800, showing a gradual decrease during the past two decades. Ripley has no important industrial establishments, it being essentially a rural community.

The area within the corporate limits is approximately one square mile, about two-thirds of which is built up. The topography of the village and surrounding country is hilly. The maximum difference in elevation within the corporation is 95 feet. The general slope in and about the village is in a southerly direction to the Ohio River. Drainage is also diverted to the east and west at Mulberry Street, which forms the watershed divide within the corporation. Red Oak Run passes through the eastern portion of the village and marks the boundary of the extreme eastern drainage district.

Public improvements comprise a water supply, installed in 1896 and approved by the State Board of Health. The supply is obtained from drilled wells located on the bank of the Ohio River some distance above the village. The average daily consumption of water is estimated to be 125,000 gallons. The supply is abundant and of apparently good quality. There are no public sewers in Ripley, although many private sewers have been built, extending for several blocks and discharging into the Ohio River and Red Oak Run. It is estimated that there are some twelve private sewer outlets which at present discharge into the Ohio River. These outlets all extend below low water level in the river and according to local testimony have not caused any complaint. There are said to be no cesspools in the village.

Proposed Sewerage. Plans for proposed sewerage, for which approval is requested, were prepared by Mr. E. F. Layman in August 1898. These plans contemplate the immediate installation of the so-called Main Street sewer. As shown on the plans this sewer, which has a total length of 2100 feet, has been designed to carry both storm water and sanitary wastes. The sewer ranges in size from 12 to 24 inches and will discharge into the Ohio River at the foot of Main Street, approximately the center of the water front of the village. The grades on this sewer range from 4.6 to 0.6 per cent for the main sewer and 14.4 per cent for the outfall. Although high velocities of flow should prevail, the plans show a flush tank to be located at the head of this sewer. The plans also show five lateral extensions which will accommodate five of the principal cross streets extending west from Main Street. These laterals will not be installed immediately. The size of the laterals are not shown on the plans. They will have a total length of 4690 feet. It is estimated that the proposed Main Street sewer will accommodate a population of 500, and that 1,000 will be tributary to the outlet when the proposed future extensions are made.

The specifications for the proposed sewers provide for a good quality of vitrified sewer tile which shall be installed in a careful manner. The details for the proposed sewers are clearly shown and provide for first class construction.

The disposal of the sewage, which will be by dilution with the flow in the Ohio River, will undoubtedly prove satisfactory, provided the sewage is discharged well below the low water line in the river and at a point where good dispersion of the sewage with the flow will be secured. It should be noted that this outlet will be the controlling feature in connection with future sewer construction, and with this in view it would seem advisable that every effort be made to secure the most efficient results by the proposed method of disposal. As shown on the plans, the outlet will be 320 feet from Front Street, which parallels the river and will terminate at the low water mark of the river. The outlet will be protected by means of a masonry bulkhead. As shown on the plans, it is evident that during minimum stages in the river a nuisance is likely to be created in the immediate vicinity of the proposed sewer outlet. In view of this it would seem advisable that the local officials be instructed to extend the outlet some distance from the low water mark in the river and at such a point where a submergence of at least six feet can be secured.

The plans for proposed sewerage, for which approval is requested, although they do not accommodate the entire village, will no doubt meet the demands of the community for many years. The sewers are planned to be tributary to a single sewer, as above described. Should the establishment of additional sewers be necessary in the future it will be advisable to install an intercepting sewer which would convey the entire sewage flow to a point below the village. This is a feature, however, which does not require immediate consideration.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held September 2, 1913, the plans for proposed sewerage for Ripley, prepared by Mr. E. F. Layman of Cincinnati, engineer for the village, received July 30, 1913, from Mr. D. W. Lemon, village clerk, were approved subject to the following conditions:

1st. That the dry weather flow of sewage shall be discharged through a cast iron outlet extended and submerged at least 6 feet below the low water elevation of the Ohio River;

2nd. That an intercepting sewer and sewage treatment plant to provide proper disposal of the dry weather flow, shall be installed when deemed necessary by the State Board of Health; and,

3rd. That this approval shall be void unless plans for a submerged outlet shall have been submitted prior to February 1, 1914, and unless the proposed sewers shall have been installed prior to November 1, 1914.

REPORT ON PROPOSED ADDITIONAL SEWERAGE AND SEWAGE TREATMENT PLANT FOR SANDUSKY.

On May 13, 1913, plans for proposed additional sewerage and sewage treatment plant for Sandusky were received from Mr. Robert L. J. Wagar, chief engineer, department of public service. The plans were referred to the engineering department and on May 29, 1913, the chief engineer visited Sandusky and investigated the proposed improvements. The following report was submitted:

Sandusky is a city with a population of 20,000, located in Erie County on Sandusky Bay into which discharges the Sandusky River. Sandusky Bay is connected with Lake Erie through a channel lying between Johnson Island and Cedar Point. The topography of the city is rather flat. The surface drainage is to the bay directly or by means of Mills Creek and Pipe Creek and small streams which flow through the westerly and southerly portions of the city, respectively.

The public water supply is obtained through an intake in Sandusky Bay located 1,400 feet off the northeast water front. The raw water is unsatisfactory due to sewage pollution contributed by the city. In 1908 a water purification plant with a capacity of 6,000,000 gallons daily was installed to purify the supply. This plant was poorly built and at the present time is being reconstructed and enlarged to a capacity of 8,000,000 gallons. The sewerage of the city has been constructed entirely on the combined plan. Fourteen outlets are located along the northwest water front at the termination of the various streets and two important sewer outlets are located on the northeast water front. Aside from these outlets there are several smaller sewers discharging along the northeast water front and at least one private sewer discharging into Mills Creek. With the exception of the so-called Whiskey Run sewer which empties into the bay in the extreme northwesterly portion of the city, the sewers serve relatively small districts. The total area of the city served by the existing sewers is 1.51 square miles, and it is estimated that 15,000 persons are connected to the sewers. In numerous cases the outlets are located at the head of estuaries formed by docks, and during quiescent conditions of the bay nuisances are caused in the vicinity of the outlets. Aside from the shore nuisances, the contamination of the bay as a whole results. The bay is a body of water about 57 square miles in area with an average depth of 10 feet. Navigation is restricted to dredged channels. Owing to the shallowness of the bay any extreme wind velocity causes agitation of deposits and currents which may carry contamination in any direction. This endangers the water supply of the city. It is, therefore, of greatest importance that the conditions attending the disposal of sewage be improved.

With a view to improving conditions the city has had prepared plans for intercepting sewers and a sewage treatment plant. Additional sewerage for the South District is also included.

PROPOSED SEWERAGE FOR SOUTH DISTRICT.

The South District, which is contiguous to the Whiskey Run Sewer District, is bounded on the north by the Lake Shore and Michigan Southern Railway right of way, on the south by the southerly corporation line of the city, on the east by Sycamore Line Street, and on the west by Mills Street. The area to be sewered is 350 acres, and has a population at the present time of 445, equivalent to 1.27 per acre. The ultimate population of the district to be sewered will be 10,500 when the density of population has reached 30 per acre. It is estimated that the development of the district will progress rapidly with the installation of sewerage facilities.

The State Board of Health previously considered plans for sewerage for the South District, at which time it was proposed to install combined sewers discharging through alternate outlets in the Sandusky Bay at the northeast water front of the city and into Pipe Creek in the southeastern portion of the city. The Board withheld approval of these plans on account of the likelihood that the pollution of the water supply would be increased.

The plans for sewerage for the South District provide for the installation of a separate system of sewers, the storm water being discharged through a single outlet into Mills Creek, and the sanitary sewers being connected with the main sewer of the Whiskey Run District at Mills Street. The storm sewers vary in size from 10 inches to 36 inches in diameter and are designed for a rainfall of 2 inches per hour over the entire area. The sanitary sewers are constructed of vitrified pipe 8 inches to 24 inches in diameter, and are designed to serve an ultimate population of 22,000 with a sewage flow of 100 gallons per capita. It is intended to construct both sanitary and storm sewers in a single trench and to construct manholes of special design to serve both lines.

PROPOSED INTERCEPTING SEWERS.

To provide for the abandonment of the existing outlets for the dry weather flow of sewage and to permit its collection at one point for treatment, a system of intercepting sewers has been designed. The system includes a main interceptor extending along the northwest water front and an east end interceptor collecting the dry weather flow along the northeast water front. The east end interceptor will be connected with the main interceptor by means of a pumping station which will discharge the sewage into the upper end of the main interceptor.

Main Intercepting Sewer. The main intercepting sewer will be carried along the northwest water front from Meigs Street at the intersection of the northwest and northeast water fronts to a sewage treatment plant, located in the extreme northwesterly portion of the city. It will start at mean high level of Lake Erie and will terminate in a pump well at an elevation 8 feet below mean high lake level. Its total length is 9,670 feet and its size ranges from 15 inches to 36 inches in diameter. It will intercept the dry weather flow from 14 outlets at present discharging along the northwest water front. The capacity of the largest section of the interceptor is 15.5 second feet, or 9.72 million gallons per 24 hours, equivalent to 300 gallons per capita with a population tributary of 32,400. The following table gives the lengths, grades, and capacities of the various portions of the intercepting sewer.

TABLE SHOWING CAPACITY OF INTERCEPTING SEWER FLOWING FULL.

Section	Length in ft.	Grade.	Size, inches.	Capacity.		Vel. ft. per sec.
				Sec. ft.	Mil. gals per 24 hrs.	
Meigs St.—Warren St.	925	0.1	15	1.63	1.06	1.3
Warren St.—Decatur St.	2,850	0.1	18	2.64	1.71	1.6
Decatur St.—Shelby St.	1,825	0.080	20	3.4	2.21	1.5
Shelby St.—Mills St.	2,055	0.078	24	5.5	3.57	1.7
Mills St.—Williams St.	1,575	0.076	36	15.5	9.72	2.1
Williams St. to Works.............	440	....	36	....	......	......

Connections with the existing combined sewers will be made by valved steel or cast iron pipes leaving the existing sewers behind a wooden dam. The dams will be placed at elevations to provide for the discharge into the interceptor of three times the dry weather flow. During and following storms the sewage diluted at least 3 to 1 will discharge directly through the existing outlets.

For the immediate installation it is proposed to install the lower portion of the main intercepting sewer comprising a length of 2,050 feet extending from the existing Whiskey Run sewer outlet to the sewage treatment plant. Funds have not been provided by the city council for the remaining portion of the main intercepting sewer.

East End Intercepting Sewer. No detailed plans have been prepared for the intercepting sewer to collect the dry weather flow from the outlets discharging at the northeast water front. In the future a separate system of sewers will be constructed in the so-called Southeast District, which will discharge into an intercepting sewer to collect the dry weather flow from all existing outlets along the northeast water front. The elevation of the sewer is such that it cannot be discharged by gravity to the main intercepting sewer and a pumping station with a force main discharging at Meigs Street will be installed. This development, is, however, not proposed at the present time.

PROPOSE SEWAGE TREATMENT PLANT.

The plans for the proposed sewage treatment plant provide for the installation of a pumping station, screen chamber, grit chamber, settling tanks, disinfection chamber, and a submerged outlet to discharge the effluent into the Sandusky Bay. For the present installation the plant will have a capacity for 25,000 population tributary, equivalent to a dry weather flow of sewage of 2.5 million gallons. Upon the basis of a population tributary to combined sewers of 18,000 at 300 gallons per capita, and a population tributary to sanitary sewers of 7,000 at 100 gallons per capita, the wet weather flow reaching the plant will be 6.1 million gallons. By connection of the Whisky Run sewer and its tributary sewers, a population of 11,000 will be served immediately. It is expected that the sewage flow within one year after the installation of the plant will be 1.5 million gallons. The capacity of the immediate installation is sufficient to serve the entire city for several years.

Site. The location selected for the treatment plant is a tract eight acres in area lying immediately east of the mouth of Mills Creek on land bordering Sandusky Bay. The area of the site is sufficient for the installation of a plant of the type selected to serve a population of 100,000. The location of the site is satisfactory for the type of plant proposed. Although the nearest dwelling is only 600 feet south of the site and 90 buildings are within 1500 feet, no occasion for complaint is likely to arise. The southerly boundary of the site is formed by a railroad right of way and the general character of the district is such that future building operations for residential purposes will be unimportant. The site selected is practically the only area of land available for sewage treatment works. If care is taken to secure proper operation of the works no objection will be raised on account of the location of the plant.

Pumping Station. The 36-inch intercepting sewer will discharge into a rectangular covered concrete reservoir, 15 by 30 feet in plan and 6 feet deep below the invert of the sewer. The bottom of the reservoir is 14 feet below mean high lake level. For a dry weather flow of 2.5 million gallons the reservoir furnishes a retention period of 11 minutes which will require constant pumping of the sewage. This feature is to be desired to secure uniform operation of the treatment plant. The pumping equipment will comprise two centrifugal pumps directly connected to 25 horse power motors. The capacity of each unit is 2700 gallons per minute so that the total pumping capacity is insufficient to care for the maximum storm flow which can be discharged from the intercepting sewer, but is sufficient to care for the maximum flow which will be discharged until the system of intercepting sewers is completed.

Space is reserved in the pumping station for the installation of additional units which may be required in the future with increased sewage flow.

Screen Chamber. The sewage will be discharged through a 16-inch line to a screen chamber where the heavier floating particles will be removed. The screen chamber is constructed of concrete and is arranged with two compartments, either or both of which can be used. Each compartment is 13 feet in length and 3 feet wide and 4 feet in depth and contains a bar screen with 1 inch openings. The screen chamber is not provided with a cover which feature may be required to prevent odor dissemination.

Grit Chamber. The grit chamber which is an extension from the screen chamber, consists of four shallow compartments each 3 feet in width and 23 feet long. The two central compartments which are direct extensions from the screen chamber compartments are for the dry weather sewage flow and either or both will be in operation depending upon the use of the screen chamber. Stop planks at the lower end of the compartments regulate the capacity, period of retention and velocity of flow in the grit chamber. The two outer compartments are for the storm flow and will automatically come into service when the sewage flow exceeds the capacity of the dry weather compartments.

The maximum capacity of the dry weather compartments is 2,000,000 gallons which will furnish an average retention period of $1^1/_7$ minutes and a velocity flow of 20 feet per minute, with a sewage flow of 2.5 million with both compartments in service. For sewage flows below this figure the capacity of the grit chamber may be reduced. With the maximum storm flow of 6.1 million gallons per day, and with all compartments in service a retention period of 0.8 minute and a velocity of 28 feet per minute will be secured. One dry weather compartment will furnish one minute retention with 23 feet velocity when the sewage flow is 1.5 million gallons.

For the purpose of draining deposits which will form in the grit chamber a line of 6 inch tile will be placed extending longitudinally along the center of each compartment. By this means no delay will be experienced in removing the grit from the compartments. Owing to their shallowness, however, frequent cleaning will be required. The grit chamber is not provided with a cover which feature may be necessitated to avoid odor production.

Settling Tanks. The settling tanks shown on the design are of the two story type with a separate sedimentation and sludge compartment. Two units are provided to be operated in parallel. Only one direction of flow is possible which will cause uneven sludge deposition. Each unit is 94 feet in length and consists of a separate sedimentation compartment with a false bottom below which are placed four circular sludge wells spaced 20 feet on centers. The sedimentation compartment of each unit has a capacity of 245,000 gallons and assuming a maximum hourly sewage flow of 1/18 of the nominal capacity of the plant, or 140,000 gallons, the total capacity of the two units provides two hours retention period. The sewage will have a velocity of 0.45 foot per minute when operating at this rate. For the storm flow, 6.1 million gallons per 24 hours, the retention period will be 2 hours and the velocity 0.8 feet per minute. The sludge wells are each 16.5 feet in diameter and the bottoms are 31 feet below the flow line of the tank. The total capacity of the sludge wells in both units is 13,800 cubic feet which supplies a retention period of but 52 days with 25,000 population tributary. The sludge well capacity should be considerably increased. Sludge piping from each well discharges into a channel leading to sludge filters provided for drying and draining of the material.

Sludge Filters. These are to be constructed with concrete surrounding and division walls. For the immediate installation it is proposed to install two units each 23 feet by 220 feet with an area of 7,260 square feet, the total area being sufficient to serve a population of 22,600. The filtering material will consist of 18 inches of sand suitably underdrained. The sludge will be applied through an 8 inch line extending longitudinally between two units in the concrete division wall and discharging through gate valves on to either unit. The division wall will be equipped with narrow gage tracks for the transfer of sludge cars.

Disinfection Chamber. The clarified effluent from the settling tanks will be further improved in quality by disinfection with hypochlorites before being discharged through the outlet. The disinfection chamber is 24 feet square and 5.5 feet deep to the flow line and is cross-baffled to secure proper mixture of the disinfecting chemical with the sewage. A storage period of nine minutes will be provided when the hourly sewage flow shall have reached 140,000 gallons. Above the disinfection chamber the chemical storage and mixing tanks and the feeding devices will be placed. The chemical will be dissolved with the aid of a motor driven mixer and will be stored in two reinforced concrete solution tanks, each with a capacity of 250 gallons. The solution will be fed through an adjustable orifice tank to the sewage as it enters the disinfection chamber.

Outlet. From the disinfection chamber the sewage will be carried through a steel or cast iron pipe 30 inches in diameter, extending some 900 feet from the shore to a point where the bay has a depth of approximately 10 feet. The discharge will take place through a multiple outlet having six openings placed 50 feet apart. By this means good dispersion of the effluent should occur.

SUMMARY.

The city of Sandusky proposes to improve conditions attending the disposal of sewage by ultimately constructing a system of intercepting sewers and sewage treatment works. These improvements will decrease the pollution of Sandusky Bay and will probably improve the quality of the raw water obtained therefrom and purified by a rapid sand filter plant. While the improvement in the disposal of sewage in advance of the extension of the water works intake is not the ideal solution of the problem, the excessive cost of the latter (estimated $375,000) has interfered with its adoption by the city council. The sewerage improvements to be installed immediately will provide for satisfactory disposal of the sewage of about one-half of the population of the city at a cost of $125,000, and at an additional expense of about $50,000 the sewage from the entire city may be cared for.

The proposed treatment works are of a capacity sufficient for a population of 25,000, and with proper operation should produce an effluent which will not be detrimental to the quality of the water of Sandusky Bay. Several revisions in the design of the plant should be made and revised detailed plans should be submitted.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the general plans for proposed additional sewerage (South District), intercepting sewers, and sewage treatment plant for Sandusky, received from Mr. Robert L. J. Wagar, chief engineer, department of public service, May 13, 1913, were approved subject to the following conditions:

1st. That a complete statement of the area and population tributary, and the dry weather sewage flow of each of the existing sewer outlets, be submitted to the State Board of Health;

2nd. That the design of the proposed sewage treatment plant be revised;

(a) By providing for at least three months sludge retention based upon a population tributary of 25,000; and,

(b) By providing suitable devices for measuring and recording the sewage flow.

3rd. That the proposed intercepting sewers be extended to divert the sewage discharged from all existing outlets prior to January 1, 1915;

4th. That a competent operator shall be employed to attend to the operation and maintenance of the intercepting sewer system and treatment plant;

5th. That the council pass an ordinance regulating the proper use of sanitary and storm water sewers; said ordinance to be approved by the Secretary of the State Board of Health prior to its passage; and,

6th. That this approval shall be void unless contracts for the installation of the proposed additional sewerage (South District), intercepting sewer west of Mills Street, and sewage treatment plant shall have been awarded prior to March 1, 1914.

The Board advised the city officials that in granting the foregoing approval it was recognized that an improvement in the disposal of sewage at Sandusky was necessary regardless of the water supply of the city; and with the completion of the intercepting sewers and sewage treatment plant an improvement in the quality of the water obtained from Sandusky Bay might be expected.

REPORT ON PROPOSED RECONSTRUCTION AND ENLARGEMENT OF SEWAGE TREATMENT WORKS AT SHELBY.

On February 1, 1913, plans for proposed reconstruction and enlargement of the sewage treatment works at Shelby were submitted by Mr. A. Elliott Kimberly, consulting engineer for the village. The plans were referred to the engineering department and the following report was submitted:

Shelby is a village with a population of about 5,000, located in Richland County on Black Fork Creek, one of the headwaters of the Muskingum River. The village has a public water supply installed in 1897 and operated by a private company, and a rather complete system of sanitary sewers. The sanitary sewers lead to sewage treatment works three miles north of the village in the valley of Black Fork Creek.

The present sewage treatment works consist of two small settling tanks or so-called sludge pits, two large settling reservoirs, and two coarse grained filters. The plant was constructed in 1900 in connection with the installation of sanitary sewers and does not incorporate any features of modern design. It has been inadequate to properly dispose of the sewage from the village. In July 1912 a petition under the Bense Act was received by the State Board of Health. A subsequent investigation showed that the plant was entirely unfit to treat the sewage from the village and was creating a decided nuisance. On November 14, 1912, an order of the State Board of Health approved by the Governor and Attorney General was transmitted to the mayor and council of the village, directing that the plant be reconstructed and enlarged within one year from that date.

PROPOSED RECONSTRUCTION AND ENLARGEMENT OF SEWAGE TREATMENT WORKS.

The plans of the consulting engineer provide for the improvement of the sewage treatment works to serve a population tributary of 4,000 and a sewage flow of 400,000 gallons per day. The design, however, is to provide for an occasional sewage flow of 600,000 gallons per day which may occur due to the infiltration of ground water. In brief the reconstructed plant will include a screen chamber, a two-story settling tank, sludge bed, and sand filters. The existing sludge pits and settling reservoirs will be abandoned. At the present time about 2500 persons are tributary to the sewers and the dry weather sewage flow is about 300,000 gallons.

The sewage arriving in the 18-inch main outfall sewer will pass through manholes provided with weirs at such elevation that a flow in excess of 600,000 gallons per day will automatically be by passed to Black Fork Creek. Additional facilities are provided so that the crude sewage or settled sewage at the outlet from the tank may be bypassed to the stream. The sewage may, therefore, receive complete, partial, or no treatment.

Settling Tank. The settling tank is a concrete structure, rectangular in shape, 29 feet long by 13 feet wide. It has a false bottom and is superimposed over a circular concrete sludge well 17 feet in diameter, the sump of which is 25 feet below the flow line of the settling compartment. The sewage after passing through a 1-inch bar screen will traverse the settling compartment and flow continuously to the filters. The settling compartment has a capacity of 22,000 gallons which with a sewage flow of 400,000 gallons provides a storage period of 1.3 hours. On a basis of 600,000 gallons sewage flow the period is 0.88 hour. It should be noted that these periods of retention are shorter than usually provided, but it is claimed by the consulting engineer that the unusual character of the sewage will permit of the use of short periods of retention. Owing to the presence of appreciable quantities of iron in the sewage, the solid matters assume a granular structure which permits of rapid sedimentation. Should the practical results not accord with the theory of the consulting engineer, an additional tank of equal capacity will be required. The sludge compartment has a capacity of 1650 cubic feet providing 80 days sludge storage with 4,000 persons tributary to the sewers.

Sludge Filter. The sludge from the tank may be removed at intervals by gravity through a cast iron sludge pipe discharging under a head of 5.5 feet. The sludge will be discharged into one of the existing sludge pits prepared for the purpose and will be pumped from this sludge pit to a sludge filter by the use of the diaphragm pump. The details of the pumping equipment have not been thoroughly worked out. It should be noted that difficulty has been encountered in pumping and subsequently drying sludge from two-story tanks. Owing to lack of available head, however, pumping is necessary. The sludge filter has an area of 1200 square feet which provides for 3600 persons tributary on a basis of three per square foot of area. This area will require extention as the connections to the sewers increase.

Filters. By the reconstruction of the existing filters and an addition of two units in the area occupied by one of the existing settling reservoirs, a filter area of 1.31 acres in four units will be provided. With a sewage flow of 400,000 gallons, the rate of operation will be 305,000 gallons per acre. The sewage will be discharged by gravity from the settling tank through an open channel provided with gate chambers by means of which any unit may be utilized. Filters will contain 30 inches of sand supported by 6 inches of graded gravel and underdrained by 4-inch tile lines connecting with the main effluent drain. No distributors are provided in the design, it being the opinion of the consulting engineer that the high rate of flow onto the surface of the filters will render unnecessary the use of distributors. The exceedingly high rate of filtration provided is also explained by the consulting engineer on a basis of the non-colloidal character of the suspended matter in the sewage.

SUMMARY.

The foregoing report indicates that in compliance with an order of the State Board of Health, the village of Shelby has had prepared the necessary plans for improvement of the sewage treatment works of the village. The plans provide for great improvement in the efficiency of the works but the realization of the best results of operation is largely dependent upon assumptions made as to the improved efficiency resulting from the character of the sewage. The settling tank and filters will operate at excessive rates, especially when the sewage flow is 600,000 gallons per day. It is entirely possible that the peculiar character of the sewage will make possible a high rate of operation but in case of the failure of the plant to produce efficiency the State Board of Health should require immediate duplication of tank capacity and enlargement of the filter area. The possibility of this requirement should be made clear at this time.

ACTION OF THE BOARD.

At a meeting held February 20, 1913, the State Board of Health approved the plans for proposed reconstruction and enlargement of the sewage treatment works at Shelby, submitted by Mr. A. Elliott Kimberly, consulting engineer for the village, February 1, 1913, subject to the following conditions:

1st. That samples of all filtering material be submitted to and receive the approval of the engineer of the State Board of Health;

2nd. That the village appoint a competent operator for the works;

3rd. That additional tank and filter capacity be added by the village within two years after the completion of the improvements, unless the results of operation of the plant shall demonstrate to the satisfaction of the State Board of Health that such additions are unnecessary; and,

4th. That this approval shall be void unless the proposed reconstruction and enlargement of the sewage treatment works shall have been made prior to November 13, 1913.

STATEMENT RELATIVE TO PLANS FOR SEWERAGE IMPROVEMENTS AT TOLEDO.

On November 20, 1913, plans for sewerage improvements at Toledo were received from Mr. J. R. Cowell, director of public service. Previous to the submission of the plans the city council took action on November 17, 1913, approving a portion of the plans, but the action of the council was not received by the State Board of Health until November 26, 1913. After a general review of the plans the following statement was submitted:

On March 20, 1913, at the time of a hearing of the city officials by the Board on the question of pollution of Ten Mile and Swan Creeks by the sewage of Toledo, the Board voted to require the submission of general plans for the abatement of the pollution of Ten Mile Creek prior to the May 1913 meeting of the Board and general plans for the abatement of the pollution of Swan Creek prior to the June 1913 meeting. On May 15th the Board granted an extension of time for the submission of plans and voted to require complete plans for sewerage and sewage treatment works for the Ten Mile and Swan Creeks Districts prior to November 15, 1913. On August 25, 1913, orders of the State Board of Health under section 1251 of the General Code requiring necessary sewers and sewage treatment works for the abatement of the pollution of Ten Mile and Swan Creeks, duly approved by the Governor and Attorney General were issued by the State Board of Health. These orders, however, contained as their requirements the completion of improvements and did not specify the time for submission of plans.

The plans received November 20, 1913, contain the following general provisions:

1st. Intercepting sewers extending along Ten Mile Creek to collect the dry weather flow at a point near LaGrange Street where it will be pumped through settling tanks, the effluent being again pumped through a force main extending across the city discharging into the Maumee River at the foot of Walnut Street.

2nd. Intercepting sewers to collect the dry weather flow discharged into Swan Creek at a point near the overflow of the Miami and Erie Canal where the sewage will be passed through settling tanks, the effluent to be pumped through a force main across the city discharging into the Maumee River at Walnut Street.

3rd. The future installation of intercepting sewers paralleling the Maumee River on the east and west sides of the stream and leading to a sewage treatment plant a short distance east of the mouth of the river. With the completion of this improvement the sewage at present discharged into the river will be intercepted and carried to the treatment plant. It is the intention, however, to maintain permanently, or as long as sufficient dilution exists, the outlets for the Ten Mile Creek and Swan Creek Districts at Walnut Street.

On November 17, 1913, the council considered the above described plans but did not approve them as a whole. That portion of the plans providing for the improvement of Ten Mile Creek District was approved, but the other features including the improvement of the Swan Creek District and the Maumee River improvement were held in abeyance. The council requests approval of the Ten Mile Creek plans with the omission of the force main extending across the city. Instead it is desired to discharge the tank effluent into Ten Mile Creek. The council also requests an extension of time for the submission of plans for the abatement of the pollution of Swan Creek.

It does not appear advisable to proceed with a definite plan for the Ten Mile Creek improvement until a general plan for sewerage improvements has been decided upon by the council and submitted to the Board for approval. If the council should reject the general plan of improvement for the entire city, as reported by the consulting engineer, the Ten Mile Creek improvement, as proposed, might not conform with the general plan to be adopted in the future. Additional time for the study of the general plans, including those for the abatement of the nuisance in Swan Creek, should be permitted.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health granted an extension of time until February 15, 1914, for the submission of complete plans for the abatement of the pollution of Swan Creek by the city of Toledo, as requested in a resolution of the city council adopted November 17, 1913, and received November 26, 1913.

The Board deferred action on the plans for the abatement of the pollution of Ten Mile Creek, received November 20, 1913, from Mr. J. R. Cowell, director of public service, approval of which was requested by the city council in an action taken November 17, 1913, and received November 26, 1913.

The Secretary was instructed to inform the authorities that action by the State Board of Health upon the above plans would be held in abeyance until a general plan of sewerage improvements for the entire city were adopted by the council and submitted to the State Board of Health.

REPORT ON PROPOSED SEWERAGE AND SEWAGE TREATMENT WORKS FOR VERMILION.

On February 13, 1913, Mr. L. E. Chapin, consulting engineer for Vermilion, submitted general plans for proposed sewerage and sewage treatment works for the village. The plans were referred to the engineering department and on March 4, 1913, one of the assistant engineers visited Vermilion and investigated the proposed improvement. After an examination of the plans the following report was submitted:

Vermilion is a village with a population of about 1400, located in Erie County on Lake Erie at the mouth of the Vermilion River. The village is provided with a public water supply obtained from Lake Erie through an intake west of the mouth of the Vermilion River and purified by a filter plant of the rapid sand type. The village has no sanitary sewers at present and only a few short storm sewers have been installed. These are misused to some extent and the need of a complete system of sanitary sewers is felt.

In 1909 the village had prepared plans for sewerage and sewage treatment works which were approved by the State Board of Health. These plans were, however, not carried out and the approval of the Board became void July 1, 1910. Recently the question of the installation of sanitary sewers has received attention by the village and preliminary plans and estimates of cost have been made to enable the council to submit the question to the vote of the people.

PROPOSED SEWERAGE.

The plans of the consulting engineer provide for the installation of sanitary sewers covering the entire area of the village and designed to permit of future extensions. The sewers will be constructed of 8-inch, 10-inch, and 12-inch vitrified pipe and will have a total length of 4.5 miles. The construction of the sewers will be in accordance with accepted practice; manholes being provided at all intersections and changes in grade and direction at an average interval of about 300 feet. Flush tanks and lamp holes to be placed at dead ends. The joints will be sealed to prevent infiltration of ground water. The topography of the village is such that the sewerage system naturally drains in an easterly direction to the valley of the Vermillion River, and an 8 inch cast iron siphon about 1000 feet in length will be provided to cross the river to a suitable site for sewerage treatment works. Pumping will be required in a low lying district of small area adjacent to the Vermilion River.

PROPOSED SEWAGE TREATMENT WORKS.

No detailed plans for sewage treatment works have been prepared by the consulting engineer and only the general features of the proposed plant are shown on the plans submitted. The general plan provides for a screen chamber, settling tanks, sludge filter, dosing chamber, and intermittent sand filters.

Site. The location selected for the sewage treatment works is a tract of land lying east of the Vermilion River near the shore of Lake

Erie. The built up portion of the village is to the west of the stream and no development has taken place on the easterly side. The plant will be located at a distance of at least 500 feet from the nearest habitation. A short distance to the east of the proposed location the Linwood Park Association owns a tract of land which is utilized as a summer resort and contains a number of summer cottages. This community will be secluded from the sewage treatment works, owing to the presence of a grove along the westerly edge of the Linwood Park property. The elevation of the site is such that it will be protected from floods in the river and ample drainage to the lake will be possible. Prevailing winds are such as to carry any odors which may arise away from the village in an easterly direction. As a whole the proposed location appears satisfactory.

General Design of Treatment Works. An open concrete screen chamber will receive the sewage from the inverted siphon and will contain a bar screen to remove the heavier suspended solids. From the screen chamber the sewage will pass from either of two plain sedimentation tanks of 20,000 and 40,000 gallons, respectively. These basins will be covered with a concrete roof. Their total capacity is such as to provide a period of retention of eight hours when the sewage flow shall have reached 180,000 gallons per day. The design of the settling basin should be revised to improve facilities for sludge removal and in order to provide ease and regularity of operation the total capacity should be divided into three units.

The sludge from the settling tanks will be discharged by gravity on a sludge filter with an area of 3,200 square feet, which is sufficient to receive the contents of the smaller sedimentation tank with a flooding depth of 0.87 foot. The filtering material will be sand.

The dosing chamber is a channel 8 feet wide and 170 feet long, extending across the end of the settling tanks and along the edge of the filters. At one end of the channel four 12-inch sequence siphons will be provided for automatic dosing of the filters. These will be housed by a small superstructure. The dosing chamber itself is not covered and may give rise to odors. A cover should be provided for in the design. Its capacity, 20,000 gallons, is sufficient to flood the filter units to a depth of 3 inches.

The filters divided into three units have a total area of 0.75 acre, sufficient to properly treat 75,000 gallons per day. Inasmuch as the present population of the village is 1400, it would appear advisable that the area for the present installation be increased to at least one acre. The filters will contain 3 feet of sand resting upon 9 inches of gravel. The effluent from the filters will be carried through a 10-inch cast iron effluent pipe submerged below the mean level of Lake Erie. The effluent discharge will be west of the mouth of the Vermillion River and will be sufficiently removed from the water works intake to avoid danger of its contamination. Government breakwaters extending into the lake to form the channel of the mouth of the river will prevent the passage of the effluent to the intake.

ACTION OF THE BOARD.

At a meeting held March 20, 1913, the State Board of Health approved the general plans for proposed sewerage and sewage treatment works for Vermilion, submitted by Mr. L. E. Chapin, consulting engineer for the village, February 13, 1913, subject to the following conditions:

1st. That the sewage treatment works be constructed before connections to the sewers are permitted;

2nd. That the village council enact an ordinance, satisfactory to the Secretary of the State Board of Health, regulating the proper use of sanitary and storm water sewers; providing a proper official to supervise the maintenance of the sewers and sewage treatment works, and providing that within two months after the completion of the sanitary sewers and sewage treatment works, all existing sewer connections in violation of the ordinance be removed;

3rd. That before contracts for the installation of sewage treatment works are awarded, revised detailed plans be prepared and submitted to the State Board of Health for approval; and,

4th. That this approval shall be void unless the proposed sewers and sewage treatment works shall have been installed prior to June 1, 1914.

The consulting engineer and authorities were advised that in the preparation of the detailed plans the following provisions should be made:

1st. Coverings for screen chamber and dosing channel;

2nd. Division of settling capacity into three units;

3rd. Improved facilities for sludge removal by increased floor slopes and proper location of drains; and,

4th. Increased area of filters to at least one acre.

REPORT ON PROPOSED INTERCEPTING SEWER FOR WAPAKONETA.

On August 19, 1913, plans for a proposed intercepting sewer for Wapakoneta were received from Mr. A. E. Kimberly, consulting engineer for the city. On August 27, 1913, the chief engineer visited Wapakoneta and investigated the proposed improvements. The following report was submitted:

Wapakoneta, a city with a population of 5,600, is located on the Auglaize River, which is tributary to the Maumee River. The stream flows in a general westerly direction through the northerly portion of the city. A water supply is derived from drilled wells located in the northeasterly portion of the city, south and east of the Auglaize River. The wells obtain their supply from limestone formations, encountered at a depth of 145 feet, and from the gravel formations overlying the limestone. The quality of the supply from a sanitary standpoint has always been satisfactory. Inadequate sewerage facilities are provided. No comprehensive system of sewers has been built and a large number of independent outlets into the Auglaize River have been established.

Previous Actions of the State Board of Health. Prior to 1902 several storm water sewers had been installed and these had been misused for sanitary purposes. In April 1902 it was proposed by the village to improve its sewerage system by constructing combined sewers in eleven sewer districts, each district to have an independent outlet in the Auglaize River. This plan was disapproved by the State Board of Health. Later, in June 1902, plans were presented providing for the construction of an intercepting sewer, paralleling the Auglaize River to receive the dry weather flow from the existing combined sewers and to serve ultimately as a main trunk sewer for a sanitary sewer system. These plans did not include provision for sewage treatment works and were disapproved by the Board. In August, 1902, the plans were again submitted, including provision for sewage treatment works and these plans received the approval of the State Board of Health.

Following this approval the village did not proceed to carry out the approved plans but instead constructed several combined sewers in accordance with the original plans submitted in April, 1902. In May, 1913, the officials of the city requested an expression of the State Board of Health relative to the improvement of sewerage conditions. They proposed the installation of an intercepting sewer to discharge into the Auglaize River at some point in the westerly portion of the city and subsequent installation of a sewage treatment plant. At a meeting of the State Board of Health held May 15, 1913, the Board voted not to oppose the construction of an intercepting sewer provided sewage treatment works be installed when required by the State Board of Health.

Existing Sewerage. As has been stated, the present sewerage of the city in inadequate. The main portion of the city lying south of the Auglaize River is drained by four principal sewer districts, each of which is partially provided with combined sewers, discharging through independent outlets into the Auglaize River. In addition there are several small sewer districts, directly tributary to the river. In the absence of adequate sewerage facilities a number of private sewers and drains discharging into the Auglaize River have also been constructed. On the southerly side of the river there are twenty-three public and private sewer outlets. That portion of the city lying north of the river is provided with so-called storm sewers discharging into the river through two outlets. These sewers are used to a limited extent to receive domestic wastes.

The discharge of sewage in its raw state into the Auglaize River has caused excessive pollution of the stream and inasmuch as it passes through the thickly built up portion of the city the conditions have met with serious complaint on the part of the residents of the city itself. With a view to improving conditions, a dam was installed in 1908 in the westerly portion of the city. The dam creates a pool, which extends a a short distance above the city. In extreme dry weather the pool thus formed becomes grossly polluted and the resulting conditions are more objectionable than existed prior to the construction of the dam.

No accurate data is available relative to the population tributary to the existing sewers. The total length of sewers is approximately 7.1 miles, and the assumption is made by the consulting engineer that the population tributary is 2800, or about 50 percent of the present population. Rough estimates indicate that the minimum flow of the river is three to four second feet and it is, therefore, apparent that the dilution afforded is not sufficient.

Contemplated Additional Sewerage. Although no proposal for additional sewerage is made the plans of the consulting engineer show the location of about 3 miles of contemplated additional sewers to be ultimately installed in that portion of the city lying south of the river. All of these extensions will follow the separate system. The district lying north of the river should be provided with sanitary sewers as the existing storm sewers are misused to a large extent to receive domestic sewage.

Proposed Intercepting Sewer. In order to remove the sewage, at present discharged into the Auglaize River, and thus prevent the nuisance, which is caused, it is proposed to install an intercepting sewer, which will parallel the river and lead to sewage treatment works to be ultimately installed. For the present it is proposed to carry the intercepting sewer to a point of discharge immediately below the dam above referred to and to construct the remaining portion of the sewer and sewage treatment works at a later date. Connections to the proposed intercepting sewer from three of the four sewers draining the main districts south of the river will be made by providing leaping weirs, designed to permit storm flows to pass the intercepting sewer when the volume of flow is in excess of four times the dry weather flow. Nineteen of the existing sewers discharging into the Auglaize River at its southerly bank are to be connected directly with the interceptor. The sewage from the northerly portion of the city is to be carried to the interceptor through an inverted siphon, constructed of two lines of 6 inch cast iron pipe. The outlet sewer for one of the main sewer districts south of the river (Skinner Run sewer) will serve as a temporary outlet for the proposed interceptor and will carry the sewage to a point immediately below the existing dam. Ultimately, with the extension of the interceptor this outlet will be abandoned for the dry weather flow and the sewage will be carried to the treatment plant.

The proposed intercepting sewer is 3580 feet in length and will be constructed of vitrified sewer pipe 15 to 20 inches in diameter. A short length will be constructed of cast iron pipe. It will have a capacity sufficient to carry four times the dry weather flow of sewage. The present dry weather sewage flow is approximately 300,000 gallons per day and the ultimate dry weather flow will be 1,000,000 gallons per day when the city has a population of 10,000. The capacity of the interceptor in relation to the dry weather sewage flow is sufficient to insure the entrance of the first flush of sewage into the interceptor. The following table gives data concerning the interceptor:

DATA RELATIVE TO INTERCEPTING SEWER.

District.	Kind of Sewers.	Ultimate Dry Weather Flow.	Max. Flow to Interceptor in Wet Weather. Cumulative Quantities.	Capacity Interceptor.
Wood Street	Sanitary	98,000	98,000	future
Water Street	Combined	216,500	964,000	1,600,000
Park Street	Combined	170,500	1,646,000	1,800,000
Blackhorf Street	Combined	189,900	2,405,000	2,900,000
North Side	Sanitary	145,500	2,550,500	2,900,000
Skinner Run	Combined	252,500	future	future
	Total	1,072,900		

Near its upper end the proposed intercepting sewer will pass the northerly boundary of the water works property, and at a change of direction will pass across the property upon which the wells are located. In order to prevent soil contamination resulting from leakage from the sewer, it should be constructed of cast iron pipe with leaded joints within a distance of 200 feet from any of the wells.

Sewage Treatment Plant. Although it is not proposed to install sewage treatment works at the present time, tentative general plans have been made by the consulting engineer. The topography of the vicinity makes it necessary that the entire dry weather flow be pumped to the treatment plant. This will be accomplished by installing a pump well with pumping machinery, having a capacity of 1,500 gallons per minute. The sewage will be passed through a screen and grit chamber before it enters the pump well. The treatment plant proper will comprise two-story settling tanks and contact filters. Inasmuch as no details for the treatment plant have been prepared it appears unnecessary to discuss the various features of the plant. Suitable sites for the plant are available on either side of the river.

Auglaize River. Above Wapakoneta the Auglaize River has a watershed area of 128 square miles. It passes through a rather level country, devoted largely to agriculture. No accurate flow measurements have been made to determine the extreme dry weather discharge of the stream. The consulting engineer presents a rough measurement, indicating a flow of 3.5 second feet. It is possible that the extreme dry weather flow falls as low as 2 second feet. Evidently the flow of the stream is not sufficient to be considered a factor in the disposal of the sewage.

SUMMARY.

A decided nuisance is created in the Auglaize River at Wapakoneta by the discharge of untreated sewage from the city. The installation of a dam in 1908, instead of improving conditions has rendered the nuisance more objectionable. The sewers of Wapakoneta have all been illegally installed in violation of the disapproval of the State Board of Health. It is proposed to improve conditions along the water front of the city above the dam by diverting the dry weather flow through an intercepting sewer, ultimately to a sewage treatment plant and temporarily to an outlet below the dam. The discharge of sewage from the proposed temporary outlet will no doubt cause an extreme pollution of the Auglaize River below Wapakoneta. The conditions above the dam will, however, be vastly improved.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held September 2, 1913, these plans for a proposed intercepting sewer for Wapakoneta, received from Mr. A. E. Kimberly, consulting engineer for the city, August 19, 1913, were approved subject to the following conditions:

1st. That the intercepting sewer shall be extended and sewage treatment works shall be installed when required by the State Board of Health;

2nd. That the city council shall pass an ordinance, approved by the Secretary of the State Board of Health, defining the proper use of sanitary, combined and storm water sewers and regulating the connections thereto;

3rd. That the portion of the proposed intercepting sewer, within 200 feet of any of the public water supply wells, shall be constructed of cast iron pipe with leaded joints; and,

4th. That this approval shall be void unless contracts for the construction of the proposed intercepting sewer shall have been awarded prior to May 1, 1914.

The city officials were advised to have prepared plans for sanitary sewers for the district north of the Auglaize River and to install sewers in that district at an early date.

REPORT ON PROPOSED ADDITIONAL SEWERAGE AND SEWAGE TREATMENT FOR WESTERVILLE.

On July 26 and August 25, 1913, plans for proposed additional sewerage, and on November 19, 1913, plans for a proposed temporary sewage treatment plant, for Westerville, were received from Messrs. Jennings, Lawrence & Lindsey, engineers for the village. On July 23 and November 21, 1913, representatives of the engineering department visited Westerville for the purpose of making examinations relative to the proposed improvement. Based upon the results of these examinations and a review of the plans the following report was submitted:

The village of Westerville is located in the northern part of Franklin County ten miles north of Columbus. The population, based on the 1910 census, is estimated to be 2,050. The village is essentially a residential community and has no important industrial establishments.

The topography of the village is generally flat, although the extreme western portion, including part of the valley of Alum Creek is somewhat broken. Surface drainage is in a westerly and southwesterly direction to Alum Creek.

Public improvements comprise a water supply of insufficient quantity, a sewerage system for the greater portion of the village and about a mile of paved streets.

Existing sewerage. The village is provided with a separate system of sewers which accommodate the eastern and northern portions. All of the sanitary wastes are conducted to a point southwest of the village and there treated by means of settling tanks and contact filters. There are a number of short lengths of storm sewers which extend in an easterly direction, all of them discharging into Alum Creek.

The existing sewage treatment works were installed in 1903 and have been the source of numerous complaints resulting largely from poor results caused by the lack of proper attention. Several attempts have been made to place the plant in proper working condition, although recent examinations have shown that these efforts have been of little avail. The effluent from the plant is discharged into Westervelt Creek, a small tributary of Alum Creek. The existing treatment works are entirely inadequate for treating the present sewage flow and should be replaced by a more suitable plant with a greater capacity. The village authorities contemplate making this change within the next few years at which time a new plant will be installed upon a site 1,200 feet south of the present plant. The present financial condition of the village will not permit of immediate improvement.

Proposed Sewerage. The proposed sewers will accommodate the western portion of the village and will necessitate the installation of an additional settling tank on the site of the existing sewage treatment works. The main sewer extends south on West Street and will have a total length of 3,800 feet. There will be two laterals, each 470 feet, on Home Street and Main Street. In addition to extensions in the sewerage system in the western portion of the village, extensions will also be made in the eastern section on Park Street, Mine Street and Hamilton Avenue. These latter extensions will be tributary to the existing sewers which at present discharge through the main outfall sewer to the existing sewage treatment works. The plans also show an extension which will accommodate State Street. This sewer is in the southern portion of the village and will have a total length of 4,650 feet. It was understood that this sewer will not be installed this year.

All of the proposed extensions will be 8-inch pipe and are planned to carry only sanitary wastes. The specifications for the work are those used by the city of Columbus and are in general satisfactory. The grades of the sewers are such as to provide a self-cleansing velocity flow. Manholes will be located at suitable intervals and at all changes of grade and direction.

There are forty-three houses which will ultimately become tributary to the proposed west-side sewer. Making allowance for eight lots which have not been built upon, the total number of houses which will ultimately become tributary to the proposed sewer will be fifty-one. Based upon the above the probable sewage flow will likely not exceed 7,000 gallons per day.

Proposed Temporary Sewage Treatment Plant. The sewage from the western portion of the village will reach the existing treatment plant at an elevation somewhat below the existing primary filters. In order to avoid pumping the sewage, the existing secondary filters will be used as primary beds, and a temporary settling tank and dosing chamber installed to provide preliminary treatment of the sewage. This tank is to be of the Imhoff type and is provided with a dosing tank which will automatically discharge on to sand filters.

The settling tank is 10 feet by 4 feet in plan and has a total depth of 8 feet 6½ inches. The sedimentation compartment has a capacity of 340 gallons, while the sludge chamber has a capacity of 80 cubic feet. The sewage enters the tank through an 8-inch inlet passing through a sedimentation chamber which is provided with a hopper shaped bottom. The slopes of the bottom are 1½ to 1 which afford ample velocity for the settling out of the solid matter. One side of the hopper bottom overlaps the opening at the V thus preventing gases and suspended matter from passing back through the sedimentation chamber.

Based upon a maximum sewage flow of 7,000 gallons per day, the sedimentation chamber of the proposed tank will have a 1.2 hour period of flow. Based upon a population tributary of 250 the capacity of the sludge chamber will provide sixty days' storage. As previously stated, the treatment plant is considered to be temporary only and, therefore, will be constructed of timber, with the exception of the bottom of the sludge chamber which will be of concrete. The tank is of such depth and elevation as to permit the removal of sludge by gravity. The plans do not show a sludge drying area, although it is thought that a portion of the filtering area can be used for this purpose. In general the settling tank is of satisfactory design and should temporarily serve the proposed additional sewerage.

The effluent from the settling tank passes to a dosing tank which has a capacity of 42.6 gallons. This tank adjoins the settling tank and is circular in plan having a diameter of 30 inches and a depth of 14 inches. This tank will be provided with a 5-inch automatic siphon. As shown on the plans the flow line in the dosing tank is above the invert of the outlet from the settling tank. From this it will be seen that the discharge of the siphon will draw upon and reduce the level of the sewage in the sedimentation tank. This feature is very objectionable owing to the fact that part of the suspended matter may be carried through the dosing tank and thus have a deleterious effect upon the filters. The capacity of the dosing tank is entirely too small and it is suggested that the engineer be instructed to enlarge this tank so that its capacity will not be less than 1,200 gallons.

The settled sewage will be applied to sand or coke filters. Two of the old secondary contact filters will be used for this purpose. These filters are 31 feet square, provided with side slopes of 1 to 1 and separated by a 13-foot earth embankment. The area of each filter is 961 square feet. The depth of flooding should the capacity of the dosing chamber be such as shown on the plans would be 0.07 inch. With a capacity of 1,200 gallons, the depth of flooding would be 2 inches. The condition of the secondary filters is such that they could not be used efficiently for final treatment. It is suggested that the old filtering material be removed and replaced by new material which shall before use receive the approval of the chief engineer of the State Board of Health, and it is further suggested that the underdrains of the filters be carefully inspected and repairs made where the lines have settled out of line. The filtering area may be increased by removing the earth embankment between the two secondary units and providing a light concrete or wooden wall which could extend but a few feet below the surface of the filters. Such a provision would permit an area of .0534 acre, and it is thought that this area will not be any too large, especially since a portion of the filter will be used at times for sludge drying.

SUMMARY.

Briefly summarizing, the village of Westerville contemplates the installation of sanitary sewers which will accommodate the western portion of the village heretofore not provided with drainage facilities. The main sewer for this district will extend in a southerly direction on West Street terminating at the site of the existing sewage treatment works. The plans and specifications for the proposed sewers are in general satisfactory.

Owing to the contemplated re-location of the existing sewage treatment plant and the installation of a new plant, the proposed settling tank which will accommodate the drainage from the western portion of the village is looked upon as a temporary installation. The proposed tank is of the Imhoff type and as shown on the plans should meet the needs of the village until such time as a complete new plant which will treat all of the sewage can be installed. There are certain details of design of the proposed temporary plant which are not satisfactory and which are worthy of comment. These relate to the capacity of the dosing chamber which is entirely too small, and the flow line in the dosing chamber which is above the invert of the outlet from the settling tank. It is suggested that the capacity of the dosing chamber be increased to at least 1,200 gallons and that the flow line in the dosing chamber or the drawing depth of the siphon be reduced to such a level as to bring the flow line below the invert of the outlet from the settling tank. The old secondary filters were found to be unfit for use and it is suggested that these filters be cleaned by removing all or the greater portion of the filtering material and that new filtering material, to be approved by the Chief Engineer, be placed in the beds. It is further suggested that the village of Westerville be not permitted to use the temporary treatment plant for a greater period than two or three years.

ACTION OF THE BOARD.

At a meeting held December 3, 1913, the State Board of Health approved the plans for proposed additional sewerage and a temporary sewage treatment plant, received July 26th, August 25th, and November 19, 1913, from Messrs. Jennings, Lawrence & Lindsey, engineers for the village of Westerville, subject to the following conditions:

1st. That the proposed temporary sewage treatment plant shall be used for a period not to exceed three years before the expiration of which time a new sewage treatment plant for the entire village shall have been provided;

2nd. That the design of the proposed sewage treatment plant shall be revised by providing a dosing chamber of at least 1,200 gallons capacity.

3rd. That the existing secondary filters which will receive the dosing chamber discharge shall be reconstructed and provided with filtering material satisfactory to the engineer of the State Board of Health; and,

4th. That this approval shall be void unless the proposed additional sewerage and sewage treatment plant shall have been installed prior to June 1, 1914.

REPORT ON PROPOSED SEWAGE TREATMENT PLANT FOR WILLOUGHBEACH PARK, NEAR CLEVELAND.

On June 7, 1913, plans for a sewage treatment plant for Willoughbeach Park were submitted by Mr. R. Winthrop Pratt, consulting engineer, with request for approval. They were referred to the engineering department for examination and the following report submitted:

Willoughbeach Park is a summer resort located on Lake Erie in Willoughby Township, Lake County. The population is entirely transient, consisting of summer visitors. As a result the sewage flow will vary greatly, but the sewers will probably never be dry because of the drainage from small springs. There is a small run passing through the park which will receive the effluent from the purification plant. On the watershed of this run are located a few farm houses and no urban population. The outlet of the treatment plant is about 800 feet above the mouth of the run.

Site. The works are to be located at the east end of the Park ground on a slope of the ravine of the run. It will be 400 feet east of the principal buildings in the park and 1,000 feet northwest of the nearest habitation. Within 1,500 feet of the works are two or three habitations. The surrounding territory consists of farm land and golf links. The area available for the works is unrestricted, as much of the neighborhood is controlled by the park owners. There is twenty-five feet of available head through the works, but a portion of the works must necessarily be constructed on filled ground.

Plant. The plant will consist of a screen chamber; a primary sedimentation tank of the two-story type; a sludge lagoon; a dosing chamber; two percolating filters; a secondary sedimentation tank of the two-story type; and a disinfection duct. The plant is designed to care for 400 persons in 12 hours at 30 gallons per capita, or 12,000 gallons for 12 hours, or 1,000 gallons per hour. Considering the character of the population, this would seem a fair estimate.

Screen Chamber. There will be a basket screen 12 by 16 inches in plan and 18 inches deep, with bars at the sides and bottom, the ends being closed by the wall of the tank and a baffle between which it is placed. It will be built of ¾ by ⅜-inch iron bars with 1-inch openings between them. The screen will be placed at the influent end of the sedimentation tank. To be cleaned it must be removed and raked out. The screenings are to be buried. If the screen becomes clogged it will be possible for the sewage to enter the sedimentation tank by overflowing the screen. There will also be a flat vertical screen of ¼-inch bars on 1½-inch centers at the outlet of the sedimentation tank.

Sedimentation Tank. This is a covered tank of the two-story type and has a longitudinal flow which will give uneven distribution of the sludge. The total depth of the tank below the flow line is 8 feet, 4 feet 6 inches in the sedimentation chamber, and 3 feet 6 inches in the sludge digestion chamber. The capacity of the sedimentation chamber is 1300 gallons (173-¼ cubic feet). The capacity of the sludge chamber is 1310 gallons (175 cubic feet). Under the estimated flow of 1000 gallons per hour, there will be a minimum storage period of 1.3 hours in the sedimentation chamber with a velicity of 0.2 foot per minute. The capacity of the sludge digestion chamber is sufficient under a rate of 30 gallons per capita per day to allow a sludge period of 83 days. The sedimentation compartment is of wood. The sludge compartment is constructed of concrete. A 6-inch cast iron sludge pipe drains from a low point in the sludge digestion chamber to a valve chamber contiguous to the tank. This chamber is 3 feet square in plan and 5 feet deep, and is completely closed except at the top, where there is a detachable steel cover ¼ inch thick.

The plans indicate that the sludge will be pumped from the valve chamber, but details of the ultimate method of disposal are lacking, although lagoons are mentioned. It is intended to remove the sludge from the tank at the end of the season only.

Dosing Chamber. The effluent from the sedimentation tank flows directly to the dosing tank which is immediately contiguous to the tank and beneath the disinfection and control house. The capacity of the dosing chamber is 1125 gallons (150 cubic feet), with a depth of 3 feet 2 inches below the flow line. It will be equipped with one 5-inch siphon of the Miller type and drained through a 6-inch vitrified pipe, the drain leading directly to the percolating filters about 8 feet away.

Filters. There are two percolating filters which will be surface fed. The single drain pipe from the dosing chamber divides into two branches at the percolating filter, gate valves being located in each branch. No provision is made for automatic alteration of the dose on the beds, but hand-operated valves are provided for this purpose. The surface of the filtering material is one foot below the bottom of the dosing chamber. Distribution is accomplished by a system of wooden troughs with adjustable gates which seem quite adequate for the purpose. The filtering material consists of "cinders, slag, or gravel, screened to pass a 1-inch mesh and to remain on ¼-inch mesh screen" and covered with 2 inches of lake sand. Underdrainage is accomplished by 4-inch vitrified bell and spigot laterals leading to a 6-inch main drain, the main drain in turn leading to the secondary settling basin. The two 6-inch drains from the two filter units are combined to one 6-inch drain to the secondary settling basin. The filter units are trapezoidal in plan with an area of 437½ square feet and a minimum depth of 5 feet 9 inches. At a rate of 1000 gallons per hour during the period of operation, the rate on the filter will be 2.4 million gallons per acre per day on one unit, or 1.2 million gallons per acre per day on two units, or 415,000 gallons per acre foot per day on one unit or 207,000 on two units, or 260 gallons per cubic yard of filtering material, or 130 gallons per cubic yard for two units. With one unit in service the contents of the dosing chamber will flood the filter to a depth of 4 inches. The frequency of discharge will be 1.1 hour. As the plant will be operated only 12 hours per day the filters will operate at the above rate only half of the time. The minimum slope of the floor of the filter beds is 1 in 50.

Secondary Settling Basin. The secondary settling basin is of the two story type, built of concrete, the sedimentation chamber being constructed of wood. The flow is in one direction and will cause an uneven distribution of the sludge in the digestion chamber. The capacity of the sedimentation chamber is 472½ gallons (63 cubic feet). It is triangular in shape, and 3 feet deep. The capacity of the sludge digestion chamber is 516 gallons (68 cubic feet.) Under the normal flow the retention in the sedimentation chamber will be 28.3 minutes. The velocity of flow will be 0.49 foot per minute. The small amount of sludge which may accumulate is to be removed through a 6-inch cast iron pipe and discharged directly into the creek at the end of the season. The elevation of the flow line of this basin is to be 1 foot below the lowest point in the percolating filters, which will probably allow sufficient head for sludge discharge. It would seem inadvisable to discharge raw sludge into the creek, and provision should be made for a more suitable method of disposal.

Disinfection Duct. The effluent from the secondary settling basin will be discharged into an 18-inch vitrified pipe. A 1½-inch galvanized wrought iron pipe leads 44 feet or more from the hypochlorite solution tanks to a point in the disinfection duct 4 inches below the discharge weir of the secondary settling basin. After being dosed with hypochlorite the effluent is finally discharged into the creek. The duct is 20 feet long, has a capacity of 262 gallons and provides a period of 15 minutes for the reaction of the hypochlorite.

Hypochlorite Solution Tanks. There will be two solution tanks of 50 gallons capacity each, the solution to be mixed and stored in the same tank, no provision having been made for a separate mixing tank. Each solution tank will hold more than sufficient hypochlorite to apply 5 parts per million chloride to 12,000 gallons of effluent per day.

SUMMARY.

The sewage from Willoughbeach Park is to be very thoroughly treated in the sewage treatment plant, which will consist of a screen chamber; primary sedimentation tank; a dosing chamber; percolating filter; secondary settling basin; disinfection duct; and a sludge lagoon. No details of the contributing sewer have been submitted. The plant has been designed for a population of 400 persons discharging 30 gallons per capita in 12 hours. The plant will have adequate periods of rest and will be operated only during the summer season. The operation of the percolating filter should be so arranged as to insure even distribution of dose on the two units. Provision should be made for proper disposal of the sludge.

These plans were approved by the Secretary June 20, 1913, subject to the following conditions:

1st. That the management of Willoughbeach Park provide for constant attention to the operation of the plant during the summer season;

2nd. That no sludge or non-disinfected effluent be discharged from the plant during the summer season; and,

3rd. That the plant be enlarged when in the opinion of the State Board of Health such enlargement shall become necessary.

INVESTIGATIONS UNDER THE BENSE ACT

(99 Ohio Laws, Page 74, Sections 1249-1261, Inclusive.)

REPORT OF INVESTIGATION OF POLLUTION OF THE LITTLE CUYAHOGA RIVER AT AKRON.

On June 26, 1913, the following petition of the board of commissioners of Summit County was received by the State Board of Health:

"*To the Ohio State Board of Health.*"

I, the undersigned, clerk of Board of Commissioners of Summit County, State of Ohio, do hereby certify that the Board of Commissioners being in session on the 23rd day of June 1913, adopted a resolution of which the following is a true copy.

Resolved, That the City of Akron, located in Summit County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Little Cuyahoga River, and by reason thereof has so corrupted said stream as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Summit County, Ohio, who reside in the vicinity of said stream.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said City of Akron to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) C. H. BOWER,
Clerk of Board of Commissioners.
Summit County, Ohio.

Dated at Akron, Ohio, this
23 day of June, 1913."

At a meeting of the State Board of Health held June 26, 1913, the matter was referred to the engineering department for investigation. On July 11, 1913, the chief engineer visited Akron and investigated the pollution of the Little Cuyahoga River. The following report was submitted:

Akron, a city with a population of 80,000, is located in Summit County on the Little Cuyahoga River a short distance above its confluence with the Cuyahoga River. The sewerage of the city is partly on the combined and partly on the separate plan. The first sewers in the central portion of the city were installed in 1880 and provided for the removal of both storm water and domestic sewage in the same conduit. All subsequent extensions in the residential portions of the city have been made on the separate plan. At the present time there are approximately 100 miles of sewers, and extensions are being made rapidly. It is estimated that a population of 70,000 is tributary to the sewers and the average dry weather flow of sewage has been estimated at 10,000,000 to 12,000,000 gallons.

The drainage of the city naturally reaches the Little Cuyahoga River, which passes through the corporation in a general northwesterly direction, entering it in its extreme south-easterly portion and leaving it in its northerly portion. Paralleling the course of the stream a trunk sewer receives the dry weather flow from the existing sewers. East of Howard Street all connection are from sanitary sewers and no overflows to the stream are provided. At Howard Street a 60 inch combined sewer is connected with the trunk sewer, which at this point becomes an interceptor. The dry weather flow enters the interceptor and the storm flow discharges directly into the Little Cuyahoga River. The outfall portion of the interceptor is a 42 inch circular brick sewer discharging into the stream at a point approximately 1500 feet west of Howard Street, a short distance north of the central portion of the city.

Little Cuyahoga River. The Little Cuyahoga River has a total watershed area of 70.6 square miles and its watershed above the main sewer outlet of Akron is 68.3 square miles. The watershed is rather flat and contains several lakes which assist in equalizing the flow of the stream. The river receives no important pollution above Akron. No flow measurements have been made to determine the discharge of the river, but judging from its watershed and taking into account the small equalization provided by storage, the minimum dry weather flow is estimated at 5 second feet. According to accepted standards this is sufficient to dilute the sewage of somewhat more than 1000 persons. It will readily be seen that during dry weather the flow of the stream is totally insufficient to dilute the sewage from the city. Below the point of outlet the Little Cuyahoga River passes through the northerly portion of the city, enterig the Cuyahoga River about one mile north of the city. In the immediate vicinity of the outlet are a number of dwellings bordering the stream. The nuisance created is not only a cause for deterioration of the property value but has also given rise to unhealthful conditions.

Cuyahoga River. The Cuyahoga River above its confluence with the Little Cuyahoga River has a watershed area of 334 square miles. It receives untreated sewage at Kent and Cuyahoga Falls, villages with populations of 4500 each, and located 4 and 12 miles above the mouth of the Little Cuyahoga River, respectively. The minimum dry weather flow of the stream is estimated at 15 second feet, which, with the minimum flow of the Little Cuyahoga River, makes a total of 20 second feet below their confluence. This flow is sufficient to satisfactorily dilute the sewage from a population of 5000. It will be seen that the minimum flow of the Cuyahoga River does not furnish a satisfactory dilution for the sewage of Akron to avoid nuisance.

Pollution of Little Cuyahoga River. On the day of examination the volume of storm flow and sewage flow was approximately equal, although the stream was not at low stage. Below the outlet the dark colored sewage became diffuse throughout the stream and discolored the entire flow. Marked odors were apparent. No analytical determinations were made to learn the extent of the polution, as, in view of the apparent excessive dilution of the sewage such refinement was not necessary. There is no doubt that serious case of stream pollution in the Little Cuyahoga River exists below Akron and that the only remedy is the installation of suitable sewage treatment works.

At a meeting held July 23, 1913, this report was considered, and the Board found that the Little Cuyahoga River below the city of Akron was polluted by sewage and other wastes from the said city, and that the conditions thereby created were detrimental to the health and comfort of the citizens of Summit County residing in the vicinity of said stream; and the Secretary was instructed to cite the authorities of the city of Akron to appear before the Board at its next regular meeting to show cause, if any exist, why the city should not be required to install sewage treatment works prior to June 1, 1915.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held September 2, 1913, after giving the authorities an opportunity to be heard, the Board adopted an order requiring the city of Akron to install and have in operation prior to June 1, 1915, sewage treatment works; and the following order was sent to the mayor and council and the director of public service October 18, 1913:

AN ORDER BY THE STATE BOARD OF HEALTH TO THE CITY OF AKRON.

WHEREAS, The State Board of Health of the State of Ohio having under consideration the conditions existing in Summit County, Ohio, as set forth in a complaint, in writing, made to said State Board of Health by the Board of Commissioners of Summit County, Ohio, as required by Section 1249 of the General Code of Ohio, did, in accordance with the duties imposed upon said Board, pursue all and singular the duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the Little Cuyahoga River below the city of Akron, Summit County, Ohio, is polluted by sewage and other wastes from said city and that the conditions thereby created are detrimental to the health and comfort of the citizens of Summit County residing in the vicinity of said stream, and

WHEREAS, Acting pursuant to the requirements of law, said State Board of Health on the 24th day of July, 1913, notified the mayor and council and the director of public service of the city of Akron of its findings and that the 2nd day of September, 1913, at Cedar Point, Ohio, had been fixed as the time and place, when and where, the said city would be given an opportunity to be heard before said Board, and

WHEREAS, On the 2nd day of September, 1913, pursuant to said notice, there appeared before the State Board of Health the assistant city solicitor of the city of Akron, and the matters as contained in said complaint were discussed by said official and by the State Board of Health, and said official stated in the presence of the Board, that the officials of the city of Akron realized that the Little Cuyahoga River was being polluted by sewage and other wastes from the city and that no protest would be entered against the State Board of Health issuing an order requiring the removal of such pollution;

THEREUPON, After discussion and due consideration of said complaint, the

State Board of Health found and determined that improvements and changes in said conditions were necessary and should be made, and adopted the following order:

"BE IT ORDERED by the State Board of Health, of the State of Ohio, that the city of Akron install and have in operation prior to June 1, 1915, sewage treatment works to correct the conditions as set forth in a petition of the Board of Commissioners of Summit County, received by the State Board of Health June 26, 1913, and as found and determined by the State Board of Health from an investigation of July 11, 1913."

THEREUPON, On motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by the said State Board of Health, of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. MCCAMPBELL, M. D.
Secretary of State Board of Health of the State of Ohio.

Sept. 17, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, and the same are in all respects approved this 17th day of October, 1913.

JAMES M. COX, *Governor of Ohio.*
TIMOTHY S. HOGAN, *Attorney General of Ohio.*

REPORT ON INVESTIGATION OF THE PUBLIC WATER SUPPLY OF CALDWELL.

On February 15, 1913, the following petition under Section 1252 of the General Code was received from Mr. W. L. Evans, health officer of Caldwell.

"*To the Ohio State Board of Health*:

I, the undersigned, health officer of the village of Caldwell, Noble County, State of Ohio, do hereby certify

That the public water supply of the village of Caldwell, located in Noble County, Ohio, is believed to be impure and dangerous to the health of the consumers of said supply.

The State Board of Health is hereby respectfully requested to investigate said public water supply of said village of Caldwell, Noble County, Ohio, and to require the removal of all sources of pollution affecting said supply; or, if this be impracticable, to require said village of Caldwell to secure a new source of water supply, or to install and place in operation, water purification works to purify said existing supply, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) W. L. EVANS,
Health Officer."

Dated at Caldwell, O., this 13th day of Feb. 1913.

At a meeting of the State Board of Health held February 20, 1913, the above petition was referred to the chief engineer for investigation and report. On March 10th and 11th, 1913, the chief engineer visited Caldwell, examined the public water supply, and conferred with the local officials relative to the installation of a new supply. The following report was submitted:

Caldwell, a village with a population of 1,430 in 1910, is located in Noble County on Duck Creek, a tributary of the Ohio River. The topography of the surrounding country is hilly and the geological formations are principally shale, limestone, and coal. Coal mining is the principal industry of the locality and is carried on extensively on the watershed of Duck Creek above the village.

PRESENT WATER SUPPLY.

The water supply of Caldwell was installed in 1898. Prior to the installation of the supply a broad investigation was made of the feasibility of securing a water of satisfactory quality from ground sources. It was found that practically all of the deep seated ground water was of a salty nature. In the valley of Duck Creek at shallow depths ground water was found which was satisfactory with respect to its chlorine content and it was finally determined to secure the water supply from a shallow well in the valley of the stream. The proposed water supply to be obtained from gravel deposits in the valley of Duck Creek was approved by the Board in January 1898.

An investigation in 1901 showed that the village had installed a large dug well 15 feet in diameter and 27 feet deep in the valley of Duck Creek, a short distance northwest of the village. A direct connection between the well and Duck Creek was also provided for emergency use. Soon after the installation of this well the available quantity of ground water was reduced and the direct connection with the stream was utilized constantly. Since that time the water supply of the village has been obtained from Duck Creek through the dug well which serves as a pump well.

Duck Creek has a watershed area above Caldwell of 48 square miles and the topography is quite hilly. The population on the watershed is about 3,000, most of which is scattered throughout the area. There are, however, several small communities located on the stream or its tributaries. Aside from the pollution which the stream receives from these communities, there are appreciable quantities of mine wastes discharged into the stream. These wastes contribute to the unsatisfactory quality of the supply and it is claimed are at times sufficient in amount to cause deterioration of the distribution system.

The water supply is pumped into the distribution system and into a distributing reservoir which is located upon a high hill west of the center of the village. The reservoir has a capacity of approximately 200,000 gallons and furnishes the supply to the village during 16 to 20 hours each day when the pumps are idle.

The water supply is available to practically the entire population and some 800 service connections have been installed. It is claimed locally that the supply is used to a slight extent for drinking and domestic purposes, although in view of the per capita consumption which averages about 50 gallons per day, it is probable that the water is used to a large extent for general purposes.

Quality of Water. The quality of the water supply of Caldwell as shown by the results of analyses of samples collected in 1906 and in 1912 is unsatisfactory. The samples collected in 1906 indicated that the supply was of unsuitable quality for domestic use. It contained a high turbidity, a high organic content, and large number of bacteria. Samples collected in July 1912 showed that the water was entirely unfit for domestic use. It contained an excessive turbidity, an objectionable organic content, and very high bacterial counts including intestinal organisms which indicate sewage contamination.

SUMMARY.

An investigation of the water supply of Caldwell shows that it is impure and dangerous to the health of the consumers. It is impracticable to remove the sources of pollution affecting the supply, and it is probably also impracticable to purify the supply. It is obvious that a new source of water supply must be secured.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held March 20, 1913, the Board found that the water supply of the village was impure and dangerous to the health of the consumers, and voted to cite representatives of the village to appear at is next meeting, April 17, 1913, to show cause, why the village should not be required to install a water supply of satisfactory quality.

In response to this citation there appeared at the meeting of the State Board of Health held April 17, 1913, Mr. H. A. Smith, village solicitor, and Mr. F. D. Coons, member of council. These representatives were informed in regard to the findings of the Board relative to the condition of the water supply and were asked to make a statement as to why the village should not improve the public water supply as suggested in the letter of citation. The village solicitor made a statement that the residents realized that a new water supply was needed and that they were willing to put in the necessary improvements if the funds could be raised. He further made a statement in regard to the inability of the village to raise the necessary funds owing to the tax limitation.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held April 17, 1913, having under consideration the matter of improvements in the public water supply of the village, the Board voted to instruct the village solicitor to furnish to the Secretary of the Board full information in regard to the taxable value of the village property, bonded indebtedness, and other information relating to the financial condition of the village as would be required by the Attorney General in order that an opinion might be secured as to the availability of the village to immediately install improvements in the public water supply.

Under date of May 8, 1913, a communication was received from the village solicitor, requesting that additional time be granted for the submission of a statement relative to the financial condition of the village relative to its ability to install a new water supply.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held May 15, 1913, this communication was presented to the Board. The Secretary was directed to instruct the village authorities to submit a statement as soon after June 1st as possible, so that the advice of the Attorney General might be secured and action taken at the June meeting of the Board.

June 21, 1913, there was received from the village solicitor a statement in compliance with a former action of the Board, by which the village was required to furnish full information in regard to the taxable value of the village property, bonded indebtedness, and other information relative to the financial standing of the village. The statement as submitted gave the total amount of the tax duplicate and the list of outstanding bonds, but did not give the information necessary to determine the ability or inability of the village to provide the necessary funds for the introduction of a public water supply.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, this statement was presented by the Secretary. The village through its officials, having been given an opportunity to be heard at the meeting of the Board held April 17, 1913, and having filed no valid evidence or protest against the necessity of the introduction of a new water supply, but basing its remonstrance solely on the ground of inability to provide the necessary funds, a matter over which the Board has no supervision, the Board adopted the report of the chief engineer and the recommendations therein contained. The following order was sent to the mayor and council and the board of trustees of public affairs July 22, 1913:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE VILLAGE OF CALDWELL.

Whereas, The State Board of Health of the State of Ohio having under consideration the condition of the public water supply of the village of Caldwell, Noble County, Ohio, as set forth in a complaint, in writing, made to the State Board of Health by the health officer, duly appointed to serve in place of a board of health for said village, and as provided in Section 1252 of the General Code, did, in accordance with the duties imposed upon said Board with reference to such complaints, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having previously inquired into and investigated the condition complained of in said complaint, and

Whereas, The State Board of Health, after investigating the conditions complained of, found that the public water supply of the village of Caldwell is impure and dangerous to the health of the consumers of said supply, and

Whereas, Acting pursuant to the requirements of Section 1253 of the General Code, said State Board of Health thereupon on the 22nd day of March, 1913, notified the mayor and council and the board of trustees of public affairs of said village of its findings and gave said village, through its officials, an opportunity to be heard before said Board on the 17th day of April, 1913, and

Whereas, On the 17th day of April, 1913, there appeared before the State Board of Health the village solicitor and a member of council, representing said village, and the matters as contained in said complaint were discussed with said Board, and

Whereas, Said officials having stated in the presence of the Board that the residents of the village realized that a new water supply was needed and that they were willing to put in the necessary improvements if the funds could be raised, the Board granted to said village thirty days time within which to submit full information in regard to the taxable value of the village property, bonded indebtedness and other information relating to the financial standing of the village, and

Whereas, Before the expiration of the thirty days a request was received asking for additional time and an extension of thirty days was given by the State Board of Health, and

Whereas, There was received from the village solicitor on the 21st day of June, 1913, a statement giving a part of the information required by the State Board of Health but not in such completeness as would be necessary to submit to the Attorney General such a statement as would be required in order to advise the village officials how to proceed to raise the funds necessary to carry out an order adopted by the State Board of Health, and

Whereas, This matter having been reported to the State Board of Health at a meeting held on the 26th day of June, 1913, the Board decided that the only remonstrance filed with the Board was on a question over which the Board had no supervision,

Thereupon, The State Board of Health found and determined that the public water supply of the village of Caldwell is impure and dangerous to the health of the consumers of the supply and did adopt the following order:

Be it Ordered by the State Board of Health of the State of Ohio that the village of Caldwell, Noble County, Ohio, install a new water supply of satisfactory quality prior to November 1, 1914.

Thereupon, On motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. McCampbell, M. D.,
Secretary of State Board of Health of the State of Ohio.

July 7, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of Ohio, and the same are in all respects approved this 22nd day of July, 1913.

James M. Cox,
Governor of Ohio.
Timothy S. Hogan,
Attorney General of Ohio.

EXAMINATION OF WATER FROM CALDWELL.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
5367	1906 July 27	none	60.	dec'd'd	none	2.83	.148	.060	.020	none
5368	July 27	none	50.	dec'd'd	none	2.54	.134	.014	.002	none
11532	1912 July 21	15	165.	vy. hy.	musty	3.92	.138	.006	.0024	1.2
11533	July 21	22	230.	vy. hy.	sl. musty	5.76	.416	.028	.015	.7

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria.	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
5367	110.0	130.	57.	467.	231.	.2	1350	Not in 50 cc.
5368	95.0	128.	28.	450.	195.	.3	750	Not in 50 cc.
11532	160.	71.	55.	578.	65.	6.0	1850	Pres. in 10 cc.
11533	120.	69.	37.5	633.	57.	15.6	13500	Pres. in 1 cc.

Source of Samples.

5367 — Duck Creek near pumping station.
5368 — Tap at pumping station.
11532 — Tap at Columbia Hotel.
11533 — Raw water from Duck Creek.

REPORT ON POLLUTION OF WILLS CREEK BY SEWAGE FROM CAMBRIDGE.

On June 6, 1912, the chief engineer visited Cambridge and investigated the sewerage conditions of the city and on December 20, 1912, one of the assistant engineers visited Cambridge for the same purpose. Both of these investigations were made relative to a complaint against the city of Cambridge for the pollution of Wills Creek by sewage discharged therein. The following report was submitted:

Cambridge, a city with a population of about 12,000, is located in Guernsey County on Wills Creek at the confluence of that stream with Leatherwood Creek. The principal part of the city is located on hilly ground, but a large part also lies in the stream valleys. The drainage from the low lying portions is slow, and both Leatherwood and Wills creeks are very sluggish streams. The city lies about thirty-five miles outside the limits of the glaciated portion of the state. The underlying rock belong to the coal measures and the drift deposits are formed by the weathering of the native rock.

The city is provided with a public water supply installed in 1896 and obtained from Wills Creek just above its confluence with Leatherwood Creek. The supply is furnished to its consumers in its raw state. The city also has a fairly complete system of sewers constructed on the separate plan. The sewerage system has been installed at various times since 1899 and at the present time serves about 75 per cent of the total population. The sewage is discharged through two outlets on opposite sides of Wills Creek at a point northwest of the built up portion of the city.

Past Action of the State Board of Health. Although plans for a sewerage system were submitted to the State Board of Health in 1897, no definite action was ever taken upon them. The sewers have therefore been installed without the formal approval of the Board.

In October 1908 a petition, under the Bense Act, complaining of the discharge of sewage into Wills Creek from Cambridge was received from the clerk of Cambridge Township. Following an investigation and report by a committee, the Board found that Wills Creek was grossly polluted by the sewage from the city. In January 1909 a hearing was granted to representatives of the city and as a result of this hearing the Board determined to postpone action on the Bense Act complaint for one year to enable the city to secure the introduction of a satisfactory public water supply. It was represented to the Board that the city was financially unable to install both a new water supply and sewage treatment works. Since that time nothing has been accomplished by the city to provide improvement of its water supply or to stop the pollution of Wills Creek.

In June, 1910, the State Board of Health considered the question of an improved water supply for the city to be obtained from wells in the valley of Leatherwood Creek. This supply not proving satisfactory upon examination, the city was requested to employ an engineer to prepare plans for a satisfactory supply not later than September 1, 1910, and to install the works not later than May 1, 1911. The city engaged the services of a consulting engineer, but plans for improvement of the existing supply were not submitted. A preliminary report upon plans in preparation was submitted by the consulting engineer May 27, 1911, at which time the Board was asked to consider the question of approving of the continued use of Wills Creek as a source of supply for the city, it being understood that the supply would be purified. The Board required that further study be made of other available sources of supply. The consulting engineer for the city proceeded to make such studies and the results were furnished to the State Board of Health, but nothing further was accomplished by the city. The question of the issuance of bonds for the improvement of the water supply of the city was submitted to the electors on two occasions during the past year. Both elections resulted in a defeat of the bond issue.

Under date of January 3, 1913, following the investigation of December 20, 1912, a communication was addressed to the board of health of Cambridge, outlining in brief, actions of the Board following the receipt of the complaint in October 1908, and suggesting that if the local board of health was of the opinion that the water supply of the city required improvement in advance of the installation of sewage treatment works, a petition under Section 1252 of the General Code be submitted to the Board requesting investigation of the water supply by the State Board of Health. On January 13, 1913, a communication was received from the secretary of the Cambridge board of health stating that after consideration the board had adopted a motion that no action be taken by that body.

It is apparent from the foregoing resume that the original petition submitted in October, 1908, should be taken up for consideration by the State Board of Health.

Pollution of Wills Creek. An examination made October 21, 1908, by a committee of the Board showed that Wills Creek at and below Cambridge was grossly polluted by the sewage from the city, and the conditions created were detrimental to the health and comfort of persons residing in the vicinity. The examination made December 6, 1912, revealed identical conditions. The examination made December 20, 1912, when the stream was at a stage above normal, revealed evidences of sewage pollution below the outlet. There is no question that the stream is seriously polluted during the greater portion of the year. In addition to the effect of the natural sluggishness of the stream, the conditions are rendered somewhat more objectionable by the presence of a low dam a short distance below the point of sewage discharge. The pool formed by this dam is at certain seasons almost entirely stale and contains putrefying sewage.

ACTION OF THE BOARD.

At a meeting held February 20, 1913, the State Board of Health considered this report.

The Board found that Wills Creek at and below the city of Cambridge was grossly polluted by sewage and other wastes discharged into the stream at Cambridge, which gave rise to foul and noxious odors, thereby creating conditions detrimental to the health and comfort of persons residing in the vicinity of the stream.

The Secretary was instructed to notify the authorities of Cambridge of the Board's findings, and to cite them to appear before the Board at its meeting March 20, 1913, to show cause, if any, why the city should not be required to install sewage treatment works prior to June 1, 1914.

The Secretary was further instructed to advise the authorities that should a petition under Section 1252 of the General Code, requesting investigation of the water supply, be submitted by the city board of health prior to or at the time of said hearing, the Board would extend the time for the installation of sewage treatment works to permit of the immediate installation of a water purification plant.

REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY OF CAMBRIDGE.

At a meeting of the State Board of Health held March 20, 1913, the city solicitor of Cambridge submitted the following petition of the board of health of that city:

"*To the Ohio State Board of Health*:

I, the undersigned, clerk of the Board of Health of the city of Cambridge, Guernsey County, State of Ohio, do hereby certify that said board being in session on the eighteenth (18th) day of March, 1913, adopted a resolution of which the following is a true copy.

Resolved, That the public water supply of the City of Cambridge, located in Guernsey County, Ohio, is believed to be impure and dangerous to the health of the consumers of said supply.

The State Board of Health is hereby respectfully requested to investigate said public water supply of said City of Cambridge, Guernsey County, Ohio, and to require the removal of all sources of pollution affecting said supply; or, if this be impractical, to require said City of Cambridge to secure a new source of water supply, or to install and place in operation, water purification works to purify said existing supply, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) WM. T. RAMSEY,
Clerk of Board of Health."

Dated at Cambridge, Ohio, this 18th day of March, 1912.

The Board voted to refer the matter to the chief engineer for investigation and report. On May 1, 1913, the chief engineer visited Cambridge and examined the public water supply in company with representatives of the city government. The following report was submitted:

Cambridge, a city with a population of about 12,000, is located in Guernsey County on Wills Creek, at the confluence of that stream with Leatherwood Creek. The topography of the locality is hilly but a large portion of the city is situated on rather level ground in the stream valley. The underlying rock formations are of the coal measures and the drift deposits are formed by the weathering of the native rock. The city is about thirty-five miles outside the limits of the glaciated area of the state.

Cambridge is provided with a public water supply, a fairly complete system of sewers constructed on the separate plan, and a number of miles of paved streets. It is a progressive and growing community and is becoming an important manufacturing center.

Previous Actions of the State Board of Health. In 1896 the State Board of Health was asked to approve the water supply for the city to be obtained from Wills Creek above its confluence with Leatherwood Creek. This proposed supply was approved subject to the condition that it should not be used or made available for domestic purposes until it had been purified by filtration in a manner satisfactory to the State Board of Health. In 1899 the city attempted to improve its water supply by construction of dug wells along the bank of Wills Creek. The wells failed to supply a sufficient quantity of water. In January 1900 the Board approved of the use of two wells on the bank of Wills Creek, but owing to failure of the wells they continued in use as a partial source of supply for not more than one year. In 1901 an attempt was made to obtain water from wells drilled near the water works pumping station. After about two years of irregular use they were abandoned. Examinations by the State Board of Health in 1905 and 1909 revealed the fact that the water supply was taken from Wills Creek directly and used to a considerable extent for domestic purposes.

During the latter part of 1909, an effort was made to obtain a ground water supply from wells drilled in the southeasterly and southerly portions of the city. An insufficient yield of water was encountered. In 1910 an effort was made to obtain a ground water supply from wells drilled in the valley of Leatherwood Creek about two miles east of the city. Although the yield of the wells as demonstrated by pumping tests was favorable, it did not appear that the quantity was sufficient to supply the city. The quality was also objectionable.

In June 1910, the Board considered the question of an improved water supply for the city and requested that an experienced engineer be retained to prepare plans for a satisfactory water supply. An engineer was engaged and studies made relative to an improved supply, but no definite proposition was adopted by the city council. In the meantime two popular bond issues failed and the question of an improved water supply was dropped until the submission of the petition on March 20, 1913.

Present Water Supply. The water supply of Cambridge has remained practically unchanged since its installation in 1896. The water is obtained from Wills Creek through a crib located above the mouth of Leatherwood Creek. A low dam provides for submergence of the intake pipe at all times. The water flows by gravity through a 24-inch gravity line to a small pump well near the bank of Wills Creek from which point it is drawn through a 16-inch suction line about 700 feet long by the pumps. The distribution system is provided with a standpipe 25 feet in diameter and 60 feet high which has a capacity of 220,000 gallons. The distribution system covers practically all the built up portion of the city and connections have been made to serve a large percentage of the population. The present water consumption is about 1.5 million gallons per day equivalent to 125 gallons per capita.

Wills Creek from which the supply is obtained has a watershed area above the point of intake of 300 square miles. The topography of the watershed is hilly but the stream follows a winding course through a level valley. The slope of the stream bed according to the report of the United States Weather Bureau is 4.5 feet per mile and the flow is, therefore, quite sluggish. Due to the topography of the watershed the stream is subject to rapid fluctuations in flow and the clayey nature of the soil imparts excessive turbidities during high stages. The geological formations above the watershed are such as to encourage coal mining operations, and a short distance south of Cambridge is located an important coal center. The drainage from these coal mines is pumped into surface ditches and reaches Wills Creek. During the period of low flow of the stream these mine wastes are a source of contamination.

Aside from the mine wastes the stream receives considerable sewage pollution. The watershed has a total population of 20,000 of which about 6,000 is contained in villages of 300 to 3,500 population. The principal villages are Byesville, with a population of 3,500, located five miles above the water works intake, and Pleasant City, with a population of 1,500 located fifteen miles above the intake. It is known that an appreciable volume of sewage reaches the stream from Byesville, although no water supply or complete sewerage system has been installed in that village.

The typhoid fever statistics of the city are an index of the sanitary conditions and of the quality of the water supply. The average annual death rate per 100,000 population, resulting from typhoid fever, from 1897 to 1912 was 52, a much higher figure than should occur in a city with a good water supply. Excessive rates occurred in 1898, 1899, 1900, 1902, and 1907 for which years the respective figures were 107, 89, 170, 100 and 73. With a satisfactory water supply these rates will be greatly reduced.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held May 22, 1913, after giving the authorities an opportunity to be heard, the Board adopted an order requiring the city of Cambridge to install a new water supply of satisfactory quality or a water purification plant to improve the quality of the existing water supply prior to January 1, 1915. The following order was sent to the mayor and council and the director of public service, July 22, 1913:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF CAMBRIDGE.

WHEREAS, The State Board of Health of the State of Ohio having under consideration the condition of the public water supply of the city of Cambridge, Guernsey County, Ohio, as set forth in a complaint, in writing, made to the State Board of Health by the board of health of the city of Cambridge, as required by Section 1252 of the General Code, did, in accordance with the duties imposed upon said Board with reference to such complaints pursue all and singular the requirements and duties to be performed by said State Board of Health, and having previously inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health after investigating the conditions complained of, found that the water supply of the city of Cambridge is impure and dangerous to health and that it is not practicable to sufficiently improve the character of the supply by removing the sources of pollution affecting it, and

WHEREAS, Acting pursuant to the requirements of Section 1253 of the General Code, said State Board of Health thereupon on the 23rd day of May, 1913, notified the mayor and council, and the director of public service of said city, of its said findings and gave said city, through its officials, an opportunity to be heard before said Board on the 26th day of June, 1913, and

WHEREAS, On the 26th day of June, 1913, there appeared before the State Board of Health Mr. S. C. Carnes, city solicitor representing said city, and the matters as contained in said complaint were discussed with said Board, and

WHEREAS, Said city solicitor, acting in behalf of the city did state that the city waived any claim of a hearing and asked that the Board proceed with the issuing of an order;

THEREUPON, After such hearing and request the State Board of Health found and determined that improvements and changes in the public water supply of the city of Cambridge are necessary and should be made and did adopt the following order:

BE IT ORDERED by the State Board of Health of the State of Ohio, that the city of Cambridge, Guernsey County, Ohio, install a new water supply of satisfactory quality, or a water purification plant to improve the quality of the existing water supply, prior to January 1, 1915.

THEREUPON, On motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. MCCAMPBELL, M. D.,
Secretary of State Board of Health of the State of Ohio.

July 7, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of Ohio, the same are in all respects approved this 22nd day of July, 1913.

JAMES M. COX,
Governor of Ohio.
TIMOTHY S. HOGAN,
Attorney General of Ohio.

EXAMINATION OF WATER FROM CAMBRIDGE.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as			
							Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.
12444	1913 May 1	10.	78.	heavy	sl. musty	2.54	.192	.024	.0064	.2
12445	May 1	11.	72.	heavy	sl. musty	2.87	.196	.014	.012	.2
12446	May 1	11.	67.	heavy	sl. musty	2.73	.188	.018	.0046	.2

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Sulphates. (SO_4)	Residue on Evaporation.		Iron.	Bacteria	
					Total.	Loss on Ignition.		Number per cc.	Colon Present.
12444	13.3	138.4	30.	46.25	320.	19.	3.5	7200	Pos. 1 & 10 cc.
12445	14.	139.6	30.	47.73	303.	12.	3.7	8960	Pos. 1 & 10 cc.
12446	13.4	134.4	30.	46.75	306.	19.	2.9	5160	Pos. 1 & 10 cc.

Source of Samples.

12444 — Tap at pumping station.
12445 — Tap at reservoir near standpipe.
12446 — Tap at Armbruster's Bakery.
The above samples were collected by W. H. Dittoe.

REPORT ON AN INVESTIGATION OF THE POLLUTION OF NIMISHILLEN CREEK AT CANTON.

On July 10, 1913, the following petition of the trustees of Canton Township, Stark County, was received:

"To the Honorable Body—The Ohio State Board of Health.

GENTLEMEN: — I, the undersigned, clerk of Canton Township, Stark County, State of Ohio, do hereby certify that the Trustees of said Township, being in session on the 9th day of June, 1913, adopted a resolution of which the following is a true copy.

Resolved, That the Township Trustees of Canton Township having received numerous complaints from residents of said Township claiming that Nimishillen Creek is being contaminated by reason of considerable of the sewage of the City of Canton being emptied in said Creek, this sewage causing obnoxious odors and causing damage to their properties—now therefore we the undersigned respectfully ask your Honorable Body to investigate conditions and take such action as you may deem advisable.

(Signed) W. E. JACKSON,
Clerk of Canton Township Board of Trustees.
JOHN W. PENROSE,
DANIEL COBAUGH,
A. EBERT FOURNACE,
Board of Township Trustees, Canton Township."

On July 11, 1913, the following petition of the board of health of the city of Canton was received:

"To The Ohio State Board of Health.

I, the undersigned, clerk of the Board of Health of Canton, Stark County, State of Ohio, do hereby certify that the said Board of Health of said city, being in session on the 8th day of June, 1913, adopted a resolution of which the following is a true copy.

Resolved, That the City of Canton, located in Stark County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Nimishillen Creek, and by reason thereof has so contaminated said creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of the city of Canton and Canton Township, Stark County, Ohio, who reside in the vicinity of said creek.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said city of Canton, to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) A. DAHINDEN, M. D.,
Clerk Board of Health, Canton, Ohio."

Dated at Canton, Ohio, this 9th day of July, 1913.

At a meeting of the State Board of Health held July 23, 1913, the petitions were referred to the engineering department and on August 14, 1913, the Chief Engineer visited Canton and investigated the pollution of Nimishillen Creek. The following report was submittted:

Canton, a city with a population of 56,000 is located in Stark County upon and above the confluence of the east and west branches of Nimishillen Creek, which stream is tributary to the Tuscarawas River. The city is provided with a rather complete system of sewers constructed on the separate plan. At the time the sanitary sewers were built in 1893 a sewage treatment plant was installed to prevent the pollution of Nimishillen Creek. This plant is still in existence, although its capacity is greatly overtaxed.

Existing Sewage Treatment Plant. The sanitary sewer system of the city connects with a single main trunk sewer discharging at a sewage treatment plant located in the extreme southerly portion of the city in the valley of Nimishillen Creek. At the time of the installation of the plant the estimated sewage flow was 800,000 gallons per day and the population tributary was 6,000. At the present time the sewage flow averages 3,000,000 gallons per day with a maximum daily rate of possibly 4,000,000 gallons. It is estimated that the population tributary is 33,000. The plant comprises open settling tanks designed to be used as chemical precipitation tanks and equipment for the removal and drying of sludge. The tank capacity is 700,000 gallons representing 5.5 hours' period of retention with the present sewage flow. During the past year lime and alum have been used to assist in the clarification of the sewage. The devices for handling the sludge, as installed, consist of pumps and filter presses to produce dry sludge cake which may be burned or hauled away for fertilizer. This equipment is not used and instead it has been the practice to pump the sludge into lagoons a short distance west of the plant, where it slowly drains and dries with the production of very offensive odors. Recently the city has taken steps to provide improved sludge drying beds to protect the city from damage claims pending the construction of a new sewage treatment plant.

The existing plant is inadequate to provide proper treatment of the sewage. The settled effluent freed of a large percentage of its suspended matter is, nevertheless, putrescible and creates objectionable conditions unless diluted to a sufficient extent. The disposal of sludge is entirely unsatisfactory and is accompanied with distinctly objectionable conditions.

Pollution of Nimishillen Creek. Nimishillen Creek has a watershed area above the sewage treatment plant of Canton of 153 square miles. Its minimum dry weather flow is estimated at 7.5 second feet. The mean summer flow does not exceed 20 second feet. It will be seen that the flow of the stream is entirely inadequate to satisfactorily dilute the sewage from a population of 33,000. With the continued extension of sewers of Canton it is reasonable to suppose that the pollution of the stream will increase. On the day of the investigation, August 14, 1913, the improperly treated sewage effluent from the Canton sewage treatment plant was seriously polluting Nimishillen Creek. In the vicinity of the outlet foul sludge deposits were observed and the stream as a whole was discolored, septic, and odorous.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held September 2, 1913, after giving the authorities an opportunity to be heard, the Board adopted an order requiring the city of Canton to install and have in operation prior to January 1, 1915, the necessary sewers and a new sewage treatment plant. The following order was sent to the mayor and council September 18, 1913:

OHIO STATE BOARD OF HEALTH,

Office of the Secretary.

AN ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF CANTON.

Whereas, The State Board of Health of the State of Ohio, having under consideration the conditions existing in and adjacent to the city of Canton, Stark County, Ohio, as set forth in complaints in writing, made to said State Board of Health by the Board of Health of the city of Canton, Stark County, Ohio, and by the trustees of Canton Township, Stark County, Ohio, did, in accordance with the duties imposed upon said Board, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaints, and

Whereas, The State Board of Health, after investigating the conditions complained of, found that Nimishillen Creek at and below the outlet of the sewage treatment plant of the city of Canton is seriously polluted by the discharge of improperly treated sewage and that conditions are thereby caused which are detrimental to the health and comfort of the citizens of the city of Canton and of Canton Township, Stark County, Ohio, and

Whereas, The city of Canton having been notified that said complaints and the report of the investigation would be considered by the State Board of Health at a regular meeting of said Board to be held September 2, 1913, the council of said city did, at a meeting held August 25, 1913, adopt a resolution authorizing and directing the mayor of said city to execute and deliver to said State Board of Health a waiver of notice and right of hearing before said Board on said complaints and finding and to consent in writing on behalf of said city to follow whatever rules and orders the said State Board of Health might make in the premises, and

Whereas, The mayor of said city having duly executed and filed with said State Board of Health waiver of notice and right of hearing and answer admitting the justness of the complaints,

Thereupon, After discussion and due consideration of said complaints, the State Board of Health found and determined that improvements and changes in said conditions were necessary and should be made, and adopted the following order:

Be it Ordered by the State Board of Health of the State of Ohio, that the city of Canton install and have in operation prior to January 1, 1915, the necessary sewers and a new sewage treatment plant to correct the conditions as set forth in petitions of the trustees of Canton Township, Stark County, and of the board of health of the city of Canton, received July 10th and 11th, 1913, respectively, and as found and determined by the State Board of Health.

Thereupon, On motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by the said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. McCampbell,

Secretary of State Board of Health of the State of Ohio.

September 17, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio and the Attorney General of the State of Ohio, and the same are in all respects approved this 18th day of September, 1913.

James M. Cox,
Governor of Ohio.
Timothy S. Hogan,
Attorney General of Ohio.

REPORT ON AN INVESTIGATION OF SEWERAGE CONDITIONS AT CHARDON AND POLLUTION OF A TRIBUTARY OF THE CHAGRIN RIVER.

On May 3, 1913, the following resolution of the council of Chardon was submitted by Mr. Robert S. Parks, village solicitor:

"A resolution requesting the State Board of Health to investigate the sewage conditions in the village of Chardon, State of Ohio.

"Whereas it has been for a long period of time the practice and custom of the inhabitants of the village of Chardon, Ohio, to connect and maintain their sanitary sewage into the ditches and drains and storm water sewers as laid and constructed by the village of Chardon, Ohio, in the various streets and alleys of said municipality to-wit:

"In Court Street; Water Street; South Main Street; South Hambden Street; North Hambden Street; North Main Street; Main Street; East Park Avenue and upon all of the cross streets and intersecting streets in said village towit: Washington Street; Tilden Avenue; Park Avenue; Claridon Road; East King Street; Huntington Street; Maple Avenue; Fifth Avenue and Cherry Avenue.

"And whereas there is now in use on a certain portion of said streets above named a certain system of sewers known and designated as 'Sewer District No. 1,' and

"Whereas all of said sewers, drains and ditches, open and covered have their outlets into certain natural water courses and complaint having come to the Council that the same are not adequate for the purpose intended and that the same is now and for a long period of time has been creating a condition detrimental to the health and comfort of the inhabitants of the village of Chardon, Ohio, and

"Whereas this Council is of the opinion that it would be advisable and to the best interest of all to have the conditions herein stated investigated by the State Board of Health;

"Therefore be it resolved by the Council of the village of Chardon, State of Ohio,

"That the State Board of Health be and is hereby requested, by its agents and authorities to make an investigation into the existing conditions in the village of Chardon, Ohio, and to make such findings and orders as the circumstances may require and the laws may authorize.

"And the Council being at all times ready and willing to do all in its power to further this work and to observe all requirements made, the report, investigation and order herein is asked with a view of effectually providing for the conditions now existing in said village.

Passed and adopted this 1st day of May 1913.

J. H. Cheney,
President of the Council.

Attest: Robert S. Parks, *Village Clerk.*
Approved: W. M. Hall, *Mayor.*"

At a meeting of the State Board of Health held May 15, 1913, the resolution was referred to the engineering department for investigation and report.

On June 26, 1913, the following petition of the trustees of Munson Township, Geauga County, was received from Mr. B. Ashcroft, clerk of that township:

"*To The Ohio State Board of Health*:

"I, the undersigned, clerk of Munson Township, Geauga County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 23rd day of June, 1913, adopted a resolution of which the following is a true copy.

"*Resolved*, That the village of Chardon, located in Geauga County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into the inlet entrance of Bass Lake, and by reason thereof has so corrupted said natural watercourse as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Munson Township, Geauga County, Ohio, who reside in the vicinity of said natural watercourse.

"The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said village of Chardon to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

B. ASHCROFT,
Clerk, Munson Township,
Geauga County, Ohio.

Dated at Munson, Ohio, this 23rd day of June, 1913."

At a meeting of the State Board of Health held June 26, 1913, the petition was referred to the engineering department for investigation and report. On May 28, 1913, the chief engineer visited Chardon and made an investigation of the conditions complained of and the following report was submitted:

Chardon, a village with a population of 1,600, is located in Geauga County on the divide between the watersheds of the Chagrin and Grand Rivers. The village is a farming community and has no industries of importance. The topography of the surrounding country is rather hilly. The village itself is located on a hill the summit of which is in the central portion of the community. Drainage takes place in all directions from the central portion of the village, but the principal drainage flows south to the headwaters of the Chagrin River.

Although numerous attempts have been made by the village officials, the community is practically without municipal imporvements. The water supply used for general purposes is obtained entirely from private wells, of which there are a large number. While it is locally thought that the wells are satisfactory, it is probable that they are in many cases polluted by nearby privies.

In 1910 the village engaged an engineer to prepare plans for a public water supply, a sanitary sewerage system and sewage treatment works. No definite plans for a water supply were submitted to the State Board of Health for the reason that several possible sources were considered and no selection was made. The plans for proposed sewerage and sewage treatment works were approved by the Board in 1911. Subsequently, on two occasions, elections for the issuance of bonds resulted in the defeat of the project.

EXISTING SEWERAGE.

As has been stated, the village is at the present time practically without sewerage facilities. Previous to 1906 a sewer was installed without the knowledge of the State Board of Health, to provide drainage for several business buildings and residences in the central portion of the village. The sewer was discharged into a small stream west of the built up portion of the village. Owing to the complaint which resulted from the pollution of the stream, an attempt was made to improve conditions by the installation of septic tanks. These, however, failed to accomplish the desired results and the discharge of the untreated sewage in the stream was resumed. It is estimated that the sewer provides drainage facilities for a population of 250 and at the time of the examination the sewage flow was sufficient to pollute the small stream receiving it. The major portion of the village is not tributary to this sewer and is totally without sewerage facilities. The topography has not required the installation of storm sewers and the street gutters furnish the only available means of drainage.

The small stream which receives the sewage from Chardon has a watershed area of about one square mile and an intermittent flow. It is tributary to the Chagrin River, which enters Bass Lake about two miles south of the village. The entire watershed area above Bass Lake is only 5.5 square miles and flow at the inlet of the lake is nil during dry weather.

General Insanitary Conditions. Although no public water supply has been installed, the use of kitchen sinks throughout the village is general. The wastes from these fixtures are discharged into the street gutters and very objectionable conditions are created. At the time of the examination conditions had been improved by a recent rain which had cleaned the gutters. However, the number of drains discharging sink wastes would indicate that in dry weather an extreme nuisance would be created. Fortunately cesspools have not been generally used in the village. It is stated locally that all water closets are connected to the sewer above described.

NECESSITY FOR WATER SUPPLY.

A public water supply of good quality should be installed at Chardon. The village is practically without fire protection and the quality of the water obtained from private wells is not to be relied upon. The inhabitants of the village, however, are not desirous of installing a water supply and the council does not appear to appreciate the desirability of the supply. If a water supply should be installed it is probable that the installation of sewers would be delayed, and the present insanitary condition of the village would be increased. Without a public water supply a system of sanitary sewers could not be generally used and would not furnish the maximum benefit to be desired from such an improvement. It is thought, however, that following the installation of sewers the inhabitants of the village will be brought to a realization of the advantages of a public supply.

SUMMARY.

From the foregoing report it will be noted that the sewerage conditions and general sanitary conditions within the village of Chardon are unsatisfactory. A small tributary of the Chagrin River is polluted by the discharge of sewage from a sewer to which more than 200 persons are tributary. General unhealthful conditions are created by the discharge of sink wastes into the city gutters.

ACTION OF THE BOARD.

At a meeting held July 23, 1913, the State Board of Health, after giving the authorities an opportunity to be heard, adopted an order requiring the village of Chardon to install and have in operation sewerage and sewage treatment works prior to January 1, 1915, and the following order was sent to the mayor and council September 18, 1913:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE VILLAGE OF CHARDON.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the conditions in and adjacent to the village of Chardon, Geauga County, Ohio, as set forth in complaints, in writing, made to the State Board of Health by the council of the village of Chardon and by the trustees of Munson Township, Geauga County, Ohio, as required by Section 1249 of the General Code of Ohio, did, in accordance with the duties imposed upon said Board, pursue all and singular the duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaints, and

WHEREAS, The State Board of Health, after investigating conditions complained of, found that the small tributary to the Chagrin River (Bass Lake inlet) at and below the village of Chardon is polluted by the sewage and other wastes from the said village, and that the conditions thereby created are detrimental to the health and comfort of the citizens of Munson Township, Geauga County, residing in the vicinity of said stream, and

WHEREAS, Acting pursuant to the requirements of law, said State Board of Health, on the 24th day of July, 1913, notified the mayor and council of the village of Chardon, so causing the contamination or pollution of such stream, of its said findings and that the second day of September, 1913, at Cedar Point, Ohio, had been fixed as the time and place, when and where. the said village would be given an opportunity to be heard before said Board, and

WHEREAS, On the second day of September, 1913, pursuant to said notice, there appeared before the State Board of Health, the mayor, president of council and village solicitor, and the matters as contained in said complaints were discussed by said officials and by the State Board of Health, and said officials admitted in the presence of the said Board that there was good cause for the complaints and that the village would not protest against the State Board of Health issuing an order requiring the removal of such pollution,

THEREUPON, After discussion and due consideration of said complaints, the State Board of Health found and determined that improvements and changes in said conditions were necessary and should be made, and adopted the following order:

"BE IT ORDERED by the State Board of Health, of the State of Ohio, that the village of Chardon install and have in operation prior to January 1, 1915, a system of sewerage and a sewage treatment plant to correct the conditions set forth in a resolution of the village council, received by the State Board of Health May 3, 1913, and in a petition of the trustees of Munson Township, Geauga County, received by the State Board of Health June 26, 1913, and as found and determined by the State Board of Health from an investigation of May 28, 1913."

THEREUPON, on motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by the said State Board of Health, of the state of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. MCCAMPBELL, M. D.,
Secretary of the State Board of Health of the State of Ohio.

September 17, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, and the same are in all respects approved this 18th day of September, 1913.

JAMES M. COX,
Governor of Ohio.
TIMOTHY S. HOGAN,
Attorney General of Ohio.

REPORT ON INVESTIGATION OF POLLUTION OF CUYAHOGA RIVER AT CUYAHOGA FALLS.

On June 25, 1913, the following petition of the board of commissioners of Summit County was received by the State Board of Health:

"AKRON, OHIO, June 24, 1913.

I, the undersigned, clerk of the Board of County Commissioners of Summit County, State of Ohio, do hereby certify that said Board of Commissioners, being in session on June 24th, 1913, adopted a resolution of which the following is a true copy:

Resolved, That the Council of the village of Cuyahoga Falls, located in Summit County, is discharging and permitting to be discharged, sewage and other wastes into the Cuyahoga River, and by reason thereof has so corrupted said stream as to give rise to foul and noxious odors, thereby creating conditions detrimental to the health and comfort of the citizens of the village of Cuyahoga Falls, Summit County, who reside in the vicinity of said stream.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said Council of Cuyahoga Falls, Ohio, to install such works or means for purifying, or otherwise disposing of its sewage or other wastes as may be determined by said Board, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies, and to protect streams against pollution,' passed April 7, 1908.

(Signed) C. H. Bower,
Clerk of County Commissioners of Summit County."

At a meeting of the State Board of Health held June 26, 1913, the matter was referred to the engineering department for investigation and on July 11, 1913, the chief engineer visited Cuyahoga Falls and investigated the pollution of the Cuyahoga River. The following report was submitted:

Cuyahoga Falls is a village with a population of 4,600, located on the Cuyahoga River about four miles above its confluence with the Little Cuyahoga River. The village has a water supply, installed in 1900, obtained from drilled wells, but has not been provided with an adequate system of sanitary sewers.

In 1903 the village had prepared and approved by the State Board of Health plans for a comprehensive system of sanitary sewers. These plans, however, have not been carried out.

Existing Sewerage. After a bond election for the installation of sewers according to plans submitted in 1903 had failed, the necessity for sewerage in certain portions of the village became apparent to certain organized interests, which installed sanitary sewers discharging at various points into the Cuyahoga River. The village has also installed a number of storm sewers discharging into the river, each of which is misused to a large extent to receive domestic sewage. Practically no record of sewers has been kept by the authorities at Cuyahoga Falls, and it is not known to what extent the village is provided with sewerage facilities. The location of the outlets into the Cuyahoga River was learned by examination of the banks of the stream. Within the village between its northerly corporation line and Chestnut Street in its extreme southerly portion there is a total of 15 sewer outlets established by the village or by private sewer constructing concerns. In addition to this number it is probable that there are at least 10 private drains discharging on the banks of the Cuyahoga River, of which there are no records. Obviously no statement can be made relative to the population tributary to the sewers or the sewage flow.

Cuyahoga River. Above Cuyahoga Falls the Cuyahoga River has a watershed area of approximately 313 square miles. The most important pollution received above the village is at Kent, a village with a population of 4,500, from which sewage is discharged into the stream in an untreated condition. The topography of the watershed is rolling and a small amount of storage is derived from several natural lakes. It is estimated that the minimum dry weather flow of the Cuyahoga River at Cuyahoga Falls is 20 second feet. This flow is sufficient to properly dilute the sewage from 5,000 persons. The minimum flow of the stream will no doubt be influenced by the future construction of a storage dam in the stream above Kent which will impound a water supply for the city of Akron. It is probable that in extreme dry weather this dam will retain the entire flow of the stream. Within the village of Cuyahoga Falls the Cuyahoga River passes through a deep and narrow gorge in which the fall of the river is excessive. This natural condition is utilized in the development of water power. Within the village five dams have been installed to impound the flow of the stream and furnish power for the operation of water turbines. Below the village, within one-half mile from the southerly corporation line, a power company has installed a concrete dam about 55 feet in height for the development of water power to generate electrical current. The pool of this dam extends almost to the lowest existing dam within the village. The effect of these dams is to retard the flow of the stream and during periods of extreme low stream discharge all of the flow passes through the water turbines. The elevation of the pools above the dams is lowered at such times and when the water turbines are shut down the flow of the stream ceases until the reservoirs have been replenished.

Extent of the Pollution of the Cuyahoga River. The discharge of sewage from Cuyahoga Falls does not create extremely offensive conditions in the Cuyahoga River. The appearance of the stream is affected, however, in its passage through the village as a result of the sewage and manufacturing wastes discharged into it. One of the principal objections attending the discharge of sewage into the Cuyahoga River at the numerous outlets is the fact that the steep slopes of the rock faces of the gorge render difficult the proper construction and location of outlets. Most of them are submerged in the pools above the dams by box extensions, but numerous outlets also discharge upon the rock sides of the gorge and thus create nuisances. Below the village the Cuyahoga River on the day of the inspection showed evidences of sewage and manufacturing wastes discharged into the stream, although the river was not at extreme low stage. It is probable that the conditions will be rendered worse when the flow of the stream is reduced below its present volume.

Past Actions of the State Board of Health. As previously stated, the Board approved plans for a comprehensive system of sewers in 1903, which plans have not been carried out. In violation of Section 1240 of the General Code, numerous sewers have been established with outlets into the Cuyahoga River at various points along its course. In September 1911, the Board voted to prohibit the use of all illegally installed sewers and to require the village to have prepared plans for the systematic construction of sanitary sewers or the interception of the sewage from the existing sewers with a view to collecting all of the sewage at one point and there purifying it when necessary. Although this action was confirmed after reconsideration in December 1911, the village has failed to fulfill the requirements of the Board.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, after giving the authorities an opportunity to be heard, the Board adopted an order requiring the village of Cuyahoga Falls to install and have in operation prior to January 1, 1915, neecessary sewers and sewage treatment works; and the following order was sent to the mayor and council August 30, 1913:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE VILLAGE OF CUYAHOGA FALLS.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the conditions existing in and adjacent to the village of Cuyahoga Falls, Summit County, Ohio, as set forth in a complaint, in writing, made to said State Board of Health by the Board of Commissioners of Summit County, Ohio, as required by Section 1249 of the General Code of Ohio, did, in accordance with the duties imposed upon said Board, pursue all and singular the duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that said village of Cuyahoga Falls, Summit County, Ohio, is discharging and permitting to be discharged sewage and other wastes into the Cuyahoga River and that the conditions thereby created are detrimental to the health and comfort of the citizens of Summit County residing in the vicinity of said stream, and

WHEREAS, The village of Cuyahoga Falls having been notified that said complaint and the report of the investigation would be considered by the State Board of Health at a regular meeting of said Board, to be held July 23, 1913, there appeared on behalf of the village the village solicitor, who, having been duly notified of the findings of the Board, was given an opportunity to be heard, and

WHEREAS, Said village solicitor presented, in the presence of said State Board of Health, a resolution adopted by the village council on July 18, 1913, waiving the right of a hearing and admitting that the village had no defense to make except that the village was without means to provide other method of disposing of the sewage and wastes unless assisted by the State Board of Health, and that the council of the village recognized the great necessity of a more sanitary system for disposing of its sewage and other wastes,

THEREUPON, After discussion and due consideration of said complaint, the State Board of Health found and determined that improvements and changes in said conditions were necessary and should be made, and adopted the following order:

BE IT ORDERED by the State Board of Health of the State of Ohio, that the village of Cuyahoga Falls, Summit County, Ohio, install and have in operation prior to January 1, 1915, necessary sewers and sewage treatment works to correct the conditions as set forth in the petition of the Board of Commissioners of Summit County, Ohio, received by the State Board of Health, June 25, 1913, and as found and determined by said State Board of Health from an investigation made July 11, 1913.

THEREUPON, On motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by the said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. McCAMPBELL, M. D.,
Secretary of State Board of Health
of the State of Ohio.

August 2, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of Ohio, and the same are in all respects approved this twenty-fifth day of August, 1913.

JAMES M. COX,
Governor of Ohio.
TIMOTHY S. HOGAN,
Attorney General of Ohio.

REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY OF EAST LIVERPOOL.

Under date of April 2, 1913, the following resolution was received from the board of health of East Liverpool:

"*To the Ohio State Board of Health,*
Columbus, Ohio.

WHEREAS, The Board of Health of the City of East Liverpool, Ohio, believes that the public water supply of said City is impure and dangerous to health, and

WHEREAS, The said water supply is taken from the Ohio River and use of said water without purification is a menace and detrimental to public health, and

WHEREAS, After years of delay, agitation, legislation, litigation and enormous expense, and

WHEREAS, The opinion of our citizens is divided as to the method of purification, and will not approve a bond issue for the improvement of said water supply: Therefore, be it

Resolved by the Board of Health of the City of East Liverpool, Ohio, that the State Board of Health shall forthwith inquire into and investigate the condition complained of.

Adopted March 28, 1913.

(Signed) DR. R. J. MARSHALL, *Mayor,*
President of the Board of Health of the
City of East Liverpool, Ohio."

(Signed)
C. H. DAVISON, *Clerk.*

At a meeting of the State Board of Health on April 17, 1913, the matter was referred to the Chief Engineer for investigation and report. On April 30, 1913, the Chief Engineer visited East Liverpool and examined the existing water supply and water works equipment in company with representatives of the city government. The following report was submitted:

East Liverpool, a city with a population of about 21,500, is located in Columbiana County on the Ohio River, which at this point flows in a westerly direction forming the southerly boundary of the city. The topography of the vicinity is very hilly and the principal portion of the city lies well above the flood plain of the river. The maximum elevation within the city is over 600 feet above the low water elevation of the river. Only a narrow strip of the city bordering the stream is inundated by high water.

The city is provided with a number of municipal improvements, including a public water supply, a partial system of sewers, a number of miles of paved streets, and a garbage and refuse incinerator. The public water supply was installed in 1879 and has been changed but little since its installation. The sewerage of the city is somewhat inadequate and the entire easterly section is without sewers. This district, known as the East End, lies up stream from the present water supply intake which fact doubtless has interfered with the installation of the sewers.

Previous Actions of the State Board of Health. For a number of years it has been realized locally that the public water supply of East Liverpool is unsatisfactory, and various investigations have been made with a view to its improvement.

In June 1909 the State Board of Health conditionally approved plans for a proposed water purification plant to purify the supply obtained from the Ohio River. Subsequently, however, these plans were not carried out.

In March 1910 a resolution of the local board of health requesting investigation of the supply was received and a subsequent investigation was made, from which the State Board of Health found that the public water supply of East Liverpool was dangerously contaminated and a menace to the public health. The local officials were furnished a copy of the report of the investigation but subsequently no further action was taken by the State Board of Health to order an improvement in the public water supply.

In March 1911 the State Board of Health considered plans for the development of a ground water supply for the city but took no action definitely approving the project. The city was permitted, however, to proceed with tests to determine the availability of the ground water supply.

EXISTING WATER SUPPLY.

As has been stated, the water supply of the city was installed in 1879 at which time an intake was established into the Ohio River at a point above pollution from the city. In order to provide storage to permit of interruption of pumping, a reservoir with a capacity of 4.5 million gallons was constructed on the hill about 320 feet above the low water mark of the Ohio River, which elevation was sufficient to supply pressure in the built up portion of the city. In 1890 a second pumping station was installed near the reservoir from which the water was pumped to an upper reservoir of 1.5 million gallons capacity, located at the summit of a hill about 600 feet above the low water of the river. Later in 1901 the lower reservoir capacity was increased by the construction of a 1.5 million gallon reservoir adjacent to the one originally built in 1879. Aside from extensions of the distribution system and additional pumping machinery installed in 1901 and 1908, no changes have been made in the water supply.

With the present equipment the water is drawn from the Ohio River through two intakes of 12 and 24 inches in diameter which extend 280 and 480 feet from the shore of the stream, respectively, leading by gravity to a pump well on the bank of the stream and adjacent to the pumping station. The water is pumped continuously into the lower reservoirs and during about thirteen hours each day from the lower reservoirs into the upper reservoirs. The reservoirs are open basins in excavation. Those built in 1879 and in 1890 have bottoms and sloping sides of brick laid in cement mortar while the newer reservoir constructed in 1901 is of concrete throughout.

The greater portion of the population is supplied from the lower reservoir and it is estimated that approximately 80 per cent. of the water consumption is furnished from this reservoir. The upper reservoir which supplies a residential district serves a daily consumption varying from 700,000 to 1,000,000 gallons per day. The total water consumption at the present time is approximately 5,000,000 gallons daily, equivalent to 232 gallons per capita. This high per capita consumption is due to the large industrial use of water and to the absence of meters which encourages waste of water. It is believed that with the introduction of a satisfactory supply and with the consequent use of meters the daily consumption would greatly decrease.

Quality of Water. It is unnecessary to discuss at length the quality of the public water supply obtained from the Ohio River and used in its raw state. Above East Liverpool the Ohio River has a watershed area of 23,300 square miles. The stream is formed at Pittsburg by the confluence of the Allegheny and Monongahela Rivers. Within a comparatively short distance above East Liverpool are a number of large communities, the sewage from which is discharged into the Ohio River or its tributaries without treatment. The principal center of population influencing the quality of the water supply of East Liverpool is the Pittsburg district which contains a population in excess of 1,000,000. Pollution from this source enters the Ohio River at points varying from 30 to 45 miles above East Liverpool. The Beaver River enters the Ohio

River about 16 miles above East Liverpool, carrying the sewage from a number of cities located upon that river and its tributaries. At the present time plans are in progress to provide sewage treatment works for the Beaver River cities, but it is not likely this improvement will effect any improvement in the quality of the water supply of East Liverpool.

The typhoid fever statistics are instructive as furnishing an index of the quality of the water supply. Fairly complete figures are available from 1893 to 1911 and from these data it is shown that the average annual death rate has been 74.7 per 100,000 population. There is little doubt that this excessive rate is primarily due to the unsatisfactory quality of the water supply.

Owing to the known unsatisfactory quality of the water supply, samples have been collected only at rare intervals. All analyses which have been made have indicated that the supply is grossly contaminated by sewage and that little improvement is effected by the short period of storage provided in the reservoirs. In view of the physical conditions which affect the supply it appears unnecessary to furnish analytical proof of the poor quality of the water.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held May 22, 1913, after giving the authorities an opportunity to be heard, the Board adopted an order requiring the city of East Liverpool to install a water purification plant prior to January 1, 1915; and the following order was sent to the mayor and council and the director of public service, July 22, 1913:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF EAST LIVERPOOL.

WHEREAS, The State Board of Health of the State of Ohio having under consideration the condition of the public water supply of the city of East Liverpool, Columbiana County, Ohio, as set forth in a complaint, in writing, made to the State Board of Health by the board of health of the city of East Liverpool, as required by Section 1252 of the General Code, did, in accordance with the duties imposed upon said Board with reference to such complaints, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having previously inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the water supply of the city of East Liverpool is impure and dangerous to health and that it is not practicable to sufficiently improve the character of the supply by removing the sources of pollution affecting it, and

WHEREAS, Acting pursuant to the requirements of Section 1253 of the General Code, said State Board of Health thereupon on the 23rd day of May 1913, notified the mayor and council and the director of public service of said city of its said findings and gave the said city, through its officials, an opportunity to be heard before said Board on the 26th day of June 1913, and

WHEREAS, On the 26th day of June there appeared before the State Board of Health the mayor and other officials, representing said city, and the matters as contained in said complaint were discussed with said Board, and

WHEREAS, Said officials stated in the presence of the Board that there was no division of opinion among the officials and citizens of East Liverpool as to the necessity of providing an improved water supply and that the officials would offer no remonstrance against the issuing of an order by the State Board of Health,

THEREUPON, After such hearing, the State Board of Health found and determined that improvements and changes in the water supply of the city of East Liverpool are necessary and should be made, and did adopt the following order:

BE IT ORDERED by the State Board of Health of the State of Ohio, that the city of East Liverpool install a water purification plant, satisfactory to the State Board of Health, prior to January 1, 1915.

THEREUPON, On motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. MCCAMPBELL, M. D.,
Secretary of State Board of Health
of the State of Ohio.

July 7, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of Ohio, and the same are in all respects approved this 22d day of July, 1913.

JAMES M. COX,
Governor of Ohio.

TIMOTHY S. HOGAN,
Attorney General of Ohio.

EXAMINATION OF WATER FROM EAST LIVERPOOL.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.
	1913									
12437	April 30	0	24.	vy. dist.	musty	1.62	.200	.098	.0084	.2
12438	April 30	0	65.	heavy	musty	2.99	.146	.106	.0046	.2

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation.		Iron.	Bacteria	
				Total.	Loss on Ignition.		Number per cc.	Colon Present.
12437	18.8	19.	64.	198.	20.	4.4	16080	Pos. 1 & 10 cc.
12438	16.8	19.	55.	203.	27.	4.6	4800	Pos. 10 cc.

Source of Samples.

12437 — Tap at pumping station.
12438 — High service reservoir.
The above samples were collected by W. H. Dittoe.

REPORT ON PROPOSED IMPROVEMENT OF SEWAGE TREATMENT PLANT AT FOSTORIA.

On May 31, 1913, plans for proposed improvement of the sewage treatment plant at Fostoria, were received from Mr. A. B. Hollenbaugh, director of public service. The plans were referred to the engineering department and the following report was submitted:

Fostoria, a city with a population of about 10,000, is located in Seneca County on Portage Creek, which is tributary to the Portage River. The topography of the city and surrounding country is flat, the entire drainage reaching Portage Creek, which flows in a northerly direction from the city. Fostoria is provided with a public water supply obtained from reservoirs impounding the flow of Portage Creek above the city, a fairly complete system of combined sewers, a sewage treatment plant, and other minor municipal improvements.

PAST ACTIONS OF THE STATE BOARD OF HEALTH.

The sewage treatment plant at Fostoria was installed in 1896, being one of the earliest Ohio plants. Its construction resulted from the pollution of Portage Creek. Continued development of the city and inattention to the proper operation of the plant resulted in its deterioration and in a recurrence of the pollution of Portage Creek. In 1908 a complaint under Section 1249 of the General Code was submitted by the trustees of Perry Township, Wood County, and subsequently investigations showed that the plant was not efficiently treating the sewage from the city. Owing to the fact that Sections 1249-1261 of the General Code were in litigation, the Board was prevented from issuing an order to the city to improve conditions.

In September 1912 investigations were made and revealed the fact that no steps had been taken to improve the plant. Accordingly, on October 28, 1912, the Board granted a hearing to representatives of the city and issued an order to the city to improve the sewage treatment plant, which order was signed by the Governor and the Attorney General and transmitted to the local officials under date of December 23, 1912. The order provided that plans for the improvement of the sewage plant should be submitted, and that the improvement should be made within six months following the approval of the order by the Governor and the Attorney General, which would be prior to July 23, 1913.

EXISTING SEWERAGE AND SEWAGE TREATMENT PLANT.

The sewerage of the city comprises some 24 miles of sewers constructed upon the combined plan. They have been built at various times since 1893. Districts Nos. 2 and 4 cover the westerly half of the city and are connected with an intercepting sewer which carries the dry weather flow to the sewage treatment plant, the storm flow reaching Portage Creek. District No. 1 is drained by a combined sewer, 6 feet in diameter. This sewer discharges near the sewage treatment plant. A short intercepting sewer 18 inches in diameter, diverts the dry weather flow to the plant. It is estimated that the total population served by the sewerage system is 6,000. The sewage flow as gaged by the city engineer is approximately 650,000 gallons per day.

The sewage treatment plant comprises a screen chamber, two storage basins constructed of concrete and brick with capacities of 200,000 gallons each, a pumping station for lifting the sewage from the storage basins, and intermittent sand filters. A small sludge well is provided near the basins from which the sludge may be pumped.

The deterioration of the plant has resulted largely from the failure of the preliminary treating devices to operate efficiently. The storage basins have not accomplished any appreciable removal of suspended matter, and consequently the filters have received practically crude sewage. With the ponding of the filters it has frequently become necessary to bypass the sewage to Portage Creek, which has resulted in complaints from riparian owners. Evidently the problem presented must be solved either by the construction of an entire new plant or by so improving the preliminary devices to provide for efficient operation of the filters. A factor of importance in the deterioration of the plant is the large volume of manufacturing wastes discharged into the sewers. These consist of pickling liquors from iron mills and sludge from a railroad water softening plant. Various investigations of the State Board of Health have shown that these wastes are very detrimental to the sewage treatment plant.

PROPOSED IMPROVEMENT OF SEWAGE TREATMENT PLANT.

The plans of the city engineer provide mainly for the reconstruction of the preliminary devices to produce a more satisfactory effluent to be discharged upon the filters. Some improvement is to be made in the secondary devices, but the principal effort is to be expended in securing good clarification of the sewage. Briefly, the improvements comprise the construction of grit chambers, the reconstruction of the storage basins to serve as plain sedimentation tanks, the installation of improved pumping machinery for dosing the filters, the provision of improved facilities for removing the sludge from the tanks, filters for the drainage and drying of the sludge, and an additional area for the final treatment.

As a whole, the plant as improved will have a capacity of 1,200,000 gallons, sufficient for a population tributary of 12,000. The present sewage flow is approximately 650,000 gallons and includes an appreciable volume of manufacturing wastes which are partially acid iron wastes from a steel mill. These have a detrimental effect upon the efficiency of the plant, and provision should be made for other means of disposal. The various devices of the sewage treatment plant as it will be improved will be considered.

Screen Chamber. The two 18 inch intercepting sewers at present discharge into a screen chamber provided with a basket screen which may be raised and cleaned by a chain hoist. This feature of the plant will remain unchanged as it has given satisfactory results.

Grit Chamber. Upon the line of each intercepting sewer above the screen chamber will be placed grit chambers to intercept the heavier suspended solids typical of sewage from combined sewers. It would appear entirely feasible to install a single grit chamber between the screen chamber and the sedimentation tanks. The grit chambers provided are each 40 feet in length by 14 feet in width, and will be 14 feet deep from the surface of the ground. The bottom of each grit chamber is arranged in four channels, one 12 inches wide, two 18 inches wide, and one 36 inches wide. Each channel is 12 inches deep at the inlet end and 6 inches deep at the outlet end. Weirs are so arranged that any increase in sewage flow will automatically throw in service the various channels. The one normally used will be the 12-inch channel and with higher flows the 18-inch and 36-inch channels will operate. If all channels are utilized, one minute retention at a velocity of 40 feet per minute will be provided when the sewage flow is 2.25 million gallons per day, or 3.7 times the dry weather flow, for which the grit chamber is designed. The design of the grit chambers provides for a flexibility of operation so that the period of retention may be adjusted with any sewage flow up to the maximum given. Owing to the shallowness of the channels frequent cleaning of the grit chamber will be necessitated and facilities for this purpose should be provided.

Sedimentation Tanks. The existing storage basins will be so modified as to act as sedimentation tanks. The principal modification will include provision of baffles and the proper sloping of the floors and sludge drains. Each basin is 100 feet in length by 30 feet in width; and as modified will have an average depth of 9.4 feet. The capacity of each basin is 200,000 gallons so that with a sewage flow of 1.2 million gallons, a period of retention of 8 hours and a velocity of flow of 0.2 foot per minute is provided. The bottom of each basin is arranged with two valleys having slopes 1 to 2, and extending longitudinally through the basin. The sludge drains discharge into a well from which the sludge will be pumped by a triplex pump to the sludge filters.

Sludge Filters. Two units, each with an area of 10,650 square feet are provided. The dimensions of each unit are 150 feet by 71 feet. While the total area provided is sufficient, it would appear advisable to provide four square units in view of the probability that the sludge will be poorly digested and of a colloidal nature, with a tendency toward slow drying. The area of each unit as designed is sufficient to receive 0.4 of the capacity of one sedimentaion tank at a flooding depth of one foot. The efficiency of the sludge filters may be advantageously increased by providing for the removal of the supernatant liquid in the settling tanks by pumping it to the intermittent filters instead of to the sludge filters. The filtering material of the sludge filters comprises 12 inches of sand supported upon 6 inches of graded stone.

Sewage Pumping Equipment. The sewage well which receives the effluent from the sedimentation tanks is a rectangular concrete structure 26 by 10 feet in plan and 26 feet deep below the surface of the ground, divided into two compartments of equal size, each 10 by 12.2 feet in plan. The bottom of the well is 12.36 feet below the flow line of the sedimentation tanks, and the capacity of the two compartments to this point is 22,500 gallons. This represents approximately 27 minutes' storage when the sewage flow is 1.2 million gallons per day. The pumping equipment comprises two centrifugal pumps with a capacity of 800 and 1500 gallons per minute, respectively. A common suction 10 inches in diameter is extended to one of the compartments of the sewage well. The advisability of independent suctions, one from each of the compartments, is evident. The total pumping capacity is such as to make possible the lifting of 1.2 million gallons during the total operating period of 5.5 hours.

Intermittent Filters. The existing intermittent filters consist of 6 units with a total area of about six acres. Two acres of this area consist of artificially constructed sand filters and four acres have the natural loam as a filtering material and are underdrained by sand trenches. The rate of operation of the filters with the existing sewage flow is approximately 108,000 gallons per acre per day which is excessive in view of the construction of the filters. While it is not proposed to alter the existing units, additional filter capacity will be provided by adding an area of five acres to the present filter area. The additional filter area will be laid out in a single unit surrounded by an embankment. The natural loam which is already underdrained will be utilized as a filtering medium and the surface will be leveled to provide uniformity of operation.

As reconstructed the total filter area will be about 11 acres which with the existing sewage flow will provide a rate of operation of 60,000 gallons per acre per day. Based upon the capacity of the preliminary devices 1.2 million gallons per day, the rate of operation of the filters will be 109,000 gallons per acre per day. It is probable that with greater efficiency of the preliminary devices more satisfactory results in the operation of the filters will result. However, the improvement and enlargement of the filter area is to be considered as a temporary expedient and with increase in the sewage flow it is probable that more suitable secondary devices will be required.

SUMMARY.

In accordance with an order of the State Board of Health transmitted December 23, 1912, the city of Fostoria proposes to improve its sewage treatment plant by increasing the efficiency of the preliminary devices and thus providing more satisfactory operating conditions for the existing filters. The additions and modifications proposed will result in better clarification of the sewage and more regular operation of the plant as a whole. The addition of sludge disposal facilities is also an important improvement. The design should be modified by making the following provisions:

1. A single grit chamber between the screen chamber and sedimentation tanks.
2. Connections for drawing off to the sewage well the upper 50 per cent or more of the capacity of the sedimentation tanks.
3. Independent suctions for sewage pumps, one leading from each compartment of the sewage well.
4. Division wall to separate sludge area into four units.

The large volume of manufacturing wastes discharged into the sewers has been an important factor in the deterioration of the sewage treatment plant, and injury to the improved works should be prevented by prohibiting the discharge of such wastes into the city sewers.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held June 26, 1913, the plans for proposed improvement of the sewage treatment plant at Fostoria, received from Mr. A. B. Hollenbaugh, director of public service, May 31, 1913, were approved subject to the following conditions:

1st. That improved devices for the secondary treatment of the sewage be provided when deemed necessary by the State Board of Health;

2nd. That daily records of operation of the plant be maintained and that summary of such records be submitted to the State Board of Health at monthly intervals;

3rd. That the city council pass an ordinance prohibiting the discharge into sewers of manufacturing wastes detrimental to the sewage treatment plant;

4th. That revised plans incorporating minor changes in the design, satisfactory to the Engineer of the State Board of Health, be submitted; and,*

5th. That this approval shall be void unless the proposed improvement of the sewage treatment plant shall have been made prior to January 1, 1914.

STATEMENT RELATIVE TO EXTENSION OF TIME FOR IMPROVEMENT OF THE SEWAGE TREATMENT PLANT AT FOSTORIA.

On September 26, 1913, a copy of a resolution of the city council of Fostoria was received from Mr. A. B. Hollenbaugh, director of public service, in which the council requested an extension of time to September 1, 1914, for the improvement of the sewage treatment plant. This resolution was referred to the engineering department and the following statement was submitted.

On December 2, 1912, the State Board of Health transmitted to the Governor and Attorney General for approval an order directing the city of Fostoria to present to the State Board of Health for approval plans for the improvement of the sewage treatment plant, and to make such improvements within six months after the date of approval of the Board's order by the Governor and Attorney General. On December 21, 1912, the Governor and Attorney General signed the order above mentioned, and on December 23rd, the order was transmitted to the officials of the city of Fostoria. The order required that the improvements must be made prior to July 21, 1913.

Following the receipt of this order the city proceeded to secure plans for the improvement of the plant and after some delay these plans were submitted to the State Board of Health May 31, 1913, and were approved by the Board June 26, 1913. Certain revisions were required and revised plans, satisfactory to the Engineering department of the State Board of Health were submitted August 13, 1913. The city council provided funds by the issuance of bonds in the amount of $20,000, and advertised the contract to be awarded September 22, 1913. Owing to the lateness of the season no bid was received for the work and it is impossible for the city to proceed with the improvement until the spring of 1914.

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* Revised plans received August 13, 1913.

There appears to be no reason why the Board should not extend the time of its order to September 1, 1914, as requested by the city council.

ACTION OF THE BOARD.

At a meeting held October 15, 1913, the State Board of Health granted this extension of time and the following order was sent to the Mayor and Council and the Director of Public Service of Fostoria, October 29, 1913:

SUPPLEMENTAL ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF FOSTORIA.

WHEREAS, The State Board of Health did, on the 2d day of December 1912, transmit to the Governor and the Attorney-General for approval an order directing the city of Fostoria, Seneca County, Ohio, to present to the State Board of Health for approval plans for the improvement of the sewage disposal plant to make such improvements within six months after the date of the approval of the Board's order by the Governor and the Attorney-General, and,

WHEREAS, On the 21st day of December 1912, the Governor and Attorney-General signed such order of the State Board of Health and a copy of said order so signed was sent to the Mayor and Council and the Director of Public Service of the city of Fostoria, and,

WHEREAS, At a meeting of the State Board of Health, held on the 15th day of October 1913, the Secretary of said Board presented a request by the council of said city for an extension of time for the completion of the sewage treatment plant for the city of Fostoria,

THEREUPON, The State Board of Health, by due action, granted an extension of time to September 1, 1914, and ordered its Secretary to transmit notice of such action to the Governor and the Attorney-General, and to request their approval of such action.

I hereby certify that said proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. McCAMPBELL, M. D.,
Secretary of State Board of Health
of the State of Ohio.

October 27, 1913.

The foregoing action of the State Board of Health has been reviewed by us, respectively, the Governor of the State of Ohio, and the Attorney-General of the State of Ohio, and the same is in all respects approved this 28th day of October, 1913.

JAMES M. COX,
Governor of Ohio.
TIMOTHY S. HOGAN,
Attorney General of Ohio.

REPORT ON INVESTIGATION OF POLLUTION OF ALUM CREEK BY SEWAGE FROM THE FRANKLIN COUNTY INFIRMARY.

On June 5, 1913, the following petition of the trustees of Marion Township, Franklin County, was received:

> "*To the Ohio State Board of Health:*
>
> I, the undersigned, clerk of Marion Township, Franklin County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 31st day of May 1913, adopted a resolution of which the following is a true copy:
>
> *Resolved,* That the Infirmary of Franklin County, located in Marion Township, Franklin County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Alum Creek, and by reason thereof has so corrupted said Alum Creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Marion Township, Franklin County, Ohio, who reside in the vicinity of said Alum Creek.
>
> The State Board of Health is hereby respectfully requested to investigate the conditions complained of and to require the said Infirmary of Franklin County, to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said Board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.
>
> (Signed) FRANK S. MILLER,
> *Clerk Marion Township.*
>
> Dated at Columbus, Franklin County, Ohio, this 31st day of May, 1913."

At a meeting of the State Board of Health held June 26, 1913, the matter was referred to the engineering department for investigation and on July 14, 1913, the chief engineer visited the Franklin County Infirmary and investigated the pollution of Alum Creek. The following report was submitted:

The Franklin County Infirmary is located about one mile southeast of Columbus and about one-half mile west of Alum Creek. The population of the infirmary fluctuates, being greatest during the winter season. The summer population is about 300 and the winter population about 350. The institution comprises a main building; four hospital buildings; a tuberculosis camp; and a recently constructed tuberculosis hospital. At the present time all of the buildings are used with the exception of the tuberculosis hospital, which it is expected will be furnished and occupied within a few months. With the completion of the tuberculosis hospital the capacity of the institution will be increased about 100. The hospital is to be utilized for the segregation of patients with advanced cases of tuberculosis. No incipient cases will be treated at the hospital.

Sewerage for the institution was installed some tweny years ago. At that time a main sewer 8 inches in diameter was extended to a point a short distance east of the infirmary, where it discharged into a large cesspool, the overflow from which was carried in an 8-inch line to Alum Creek. The line conveying the overflow from the cesspool has a length of approximately one-half mile and discharges into Alum Creek at a point about three-quarters of a mile southeast of the institution. The cesspool is cleaned bi-yearly and it is reasonable to suppose that considerable solid matter is carried to the outlet.

The volume of the sewage flow could not be definitely ascertained. No records are kept of the water consumption, although the superintendent of the institution states that it is at least 75,000 gallons per day. This figure may be assumed as representing the average sewage flow. As is the case with all large institutions, the sewage flow is subject to fluctuation and the maximum hourly flow is greatly in excess of the average. This fluctuation tends to decrease the efficiency of the cesspool mentioned. With the addition of sewage from the new tuberculosis hospital the volume of flow will be appreciably increased and the sewage will be of a more infectious character. Regardless of the creation of a nuisance in Alum Creek, the necessity for purification of the sewage from the institution is apparent.

Pollution of Alum Creek. At the point of discharge of the sewage from the institution, Alum Creek was slightly polluted on the day of the examination. The flow of the stream was low but not at its minimum point. The watershed area above the outlet is about 180 square miles and the minimum flow of the creek is estimated at 5 second feet. In the vicinity of the outlet floating sludge was noted and the bottom of the stream contained some settled deposits. A slight odor was apparent at the outlet. Although the pollution on the day of the inspection was not important, it is possible that with extreme low flow a local nuisance would be caused.

The principal pollution of Alum Creek results from the occasional discharge of sewage into the stream within the city of Columbus. A storm water overflow 9 feet in diameter discharges into the creek a short distance south of Main Street, coming into operation during excessive sewage flow following rainfall and when the pumping station provided to lift the dry weather flow is idle. The pollution of Alum Creek by this means has been of more or less constant occurrence for a number of years, even following the installation of improved sewage disposal works for Columbus in 1908.

SUMMARY.

From the foregoing report it will be noted that the wastes from the Franklin County Infirmary are discharged into Alum Creek without treatment and thereby cause a slight pollution of the stream. The discharge of sewage from a tuberculosis hospital to be completed and occupied with a few months, introduces a condition which should be given more thought perhaps than the pollution of the stream itself. The highly infectious character of the sewage from the tuberculosis hospital will require that an efficient and complete method of treatment be provided. It is believed, therefore, that the Board should recognize the seriousness of the future conditions and require the commissioners of Franklin County to provide means to avoid contamination of Alum Creek.

ACTION OF THE BOARD.

At a meeting of the State Board of Health held July 23, 1913, after giving the authorities an opportunity to be heard, the Board adopted an order requiring the board of commissioners of Franklin County to install and have in operation prior to July 1, 1914, sewage treatment works; and the following order was sent to the board of county commissioners September 18, 1913:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE COMMISSIONERS OF FRANKLIN COUNTY, OHIO, RELATIVE TO THE POLLUTION OF ALUM CREEK BY SEWAGE AND OTHER WASTES FROM THE FRANKLIN COUNTY INFIRMARY.

WHEREAS, The State Board of Health, of the State of Ohio, having under consideration the condition existing in Marion Township, Franklin County, Ohio, as set forth in a complaint, in writing, made to the State Board of Health by the trustees of Marion Township, Franklin County, Ohio, as required by Section 1249 of the General Code of Ohio, did, in accordance with the duties imposed upon said Board, pursue all and singular the duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that Alum Creek at and below the outlet of the sewer from the Franklin County Infirmary is polluted by sewage and other wastes from said institution so as to give rise to foul and noxious odors, and that the discharge of the sewage from the tuberculosis hospital, nearing completion, will increase the pollution and create conditions detrimental to the health and comfort of the citizens of Marion Township, Franklin County, Ohio, who reside in the vicinity of said stream, and

WHEREAS, Acting pursuant to the requirements of law, said State Board of Health on the 24th day of July, 1913, notified the commissioners of Franklin County, Ohio, having charge and control of said institution, of its said findings and that the 2d day of September, 1913, at Cedar Point, Ohio, had been fixed as the time and place, when and where, the said commissioners would be given an opportunity to be heard before said Board, and

WHEREAS, On the 2d day of September, 1913, pursuant to said notice, the State Board of Health being prepared to grant such hearing, representatives of said county were called for and there was no response;

THEREUPON, After discussion and due consideration of said complaint, the State Board of Health found and determined that improvements and changes are necessary to correct conditions now existing in Alum Creek, and adopted the following order:

"BE IT ORDERED by the State Board of Health of the State of Ohio, that the Board of Commissioners of Franklin County, install and have in operation prior to

July 1, 1914, sewage treatment works to correct the conditions set forth in a petition of the trustees fo Marion Township, Franklin County, Ohio, received by the State Board of Health June 5, 1913, and as found and determined by the State Board of Health from an investigation made July 14, 1913."

Thereupon, On motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by the State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. McCampbell, M. D.,
Secretary of State Board of Health of the State of Ohio.

Sept. 17, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, and the same are in all respects approved this 18th day of September, 1913.

James M. Cox,
Governor of Ohio.

Timothy S. Hogan,
Attorney General of Ohio.

REPORT ON AN INVESTIGATION OF THE PUBLIC WATER SUPPLY OF IRONTON.

Under date of September 8, 1909, there was transmitted by Mr. T. J. Hayes, clerk, the following resolution of the board of health of Ironton, adopted at a meeting held September 7, 1909:

"Whereas, The Ohio River receives the sewage of several millions of people before it reaches Ironton.

Whereas, It is the source of much typhoid fever and allied disease.

Whereas, It is not, in its present condition, a suitable source of water supply for Ironton.

Whereas, The city of Ironton having installed a filtration system that fails to do the work intended, gets its water direct from the Ohio River; therefore be it

Resolved, That the water furnished by the Ironton city water works be condemned, being a menace to life and health and unfit for use.

Resolved, That a copy of these resolutions be forwarded to the State Board of Health asking that it make an investigation and render such relief as the law allows."

In accordance with the above resolution, the acting chief engineer visited Ironton on September 14, 1909, for the purpose of making an examination on the ground. The low stage of the Ohio River then prevailing prevented the collection of samples necessary to make the investigation complete. Therefore, by arrangement and on notification from the local authorities, another visit was made by one of the assistant engineers on January 6 and 7, 1910. The following report was made, based on information gained during these two visits and on previous investigations made by the State Board of Health:

Ironton is the county seat of Lawrence County and is located in the most southerly portion of the state on the Ohio River. It occupies a stretch of nearly level land formed by old river deposits and having a general elevation of about 50 feet above low water. Back of this stretch of level land rise steep hills forming the sides of the river valley. Conforming to the topography just described, the city has a length of about four miles and a width of from one-half to three-fourth of a mile.

The present estimated population is about 13,000. Ironton is largely supported by a number of important industrial concerns including iron and steel works, brick works, and lumber mills. The city seems to have a substantial growth and presents a generally modern and up-to-date appearance.

HISTORY OF WATER WORKS WITH SPECIAL REFERENCE TO ACTIONS AND INVESTIGATIONS OF THE STATE BOARD OF HEALTH.

The water works were originally installed in 1871 or 1872. As this was before the time when the dangers of untreated surface waters as sources of public water supplies were fully realized, a direct intake into the Ohio River was provided. A pumping station was placed upon the bank of the river at the end of the intake pipe, and a distribution system of mains was laid capable of meeting the demands of the city at that time. No storage reservoir was included. Until 1907 the water works remained essentially as above described, though the original pumps were replaced, new boilers were added, and the distribution system was greatly extended.

For a number of years the water supply had been unsatisfactory to a large proportion of the population, due principally to its high turbidity during periods of flood but also because of its unsanitary quality as evidenced by a prevailing high typhoid fever death rate. (See accompanying table of vital statistics.)

In 1894 the first definite steps were taken toward securing an improved water supply. In this year C. H. Benzenberg was engaged as consulting engineer and recommended digging a large test well in the level lands bordering the river to the northward. Owing to the abandonment of the work by the contractor, the well was never completed.

In 1901 a sample of water from a well at the works of the Ironton Door and Manufacturing Company was submitted to the State Board of Health as a proposed additional supply. The analysis besides indicating considerable hardness, also gave evidence of some polluting influences. The well was accordingly disapproved as a source of additional supply, and notice of this action was sent to the city engineer July 2, 1901.

The project of obtaining a supply from wells was somewhat further considered, but it appeared that most drilled wells in the vicinity yielded water highly impregnated with minerals; and further, those wells which seemed most satisfactory from a quality point of view were deficient in quantity of water available.

Early in 1906 the matter of an improved water supply was again taken up. At this time, after several further attempts, the project of obtaining a water supply from ordinary drilled or dug wells was abandoned and it was realized that river water purified by some means must be resorted to. Standard methods of water purification by filtration were considered, but believing these to be excessively costly they were not favored by the local authorities. Impressed by the signal success of the city of Gallipolis in obtaining a very satisfactory water supply by means of shallow wells placed in the gravel deposits of the Ohio River, the Ironton authorities decided to install a similar arrangement.

On February 21, 1906, one of the engineers of the Board visited Ironton and learned that the adaptation of the Gallipolis system contemplated by the water works authorities consisted of a series of wells 8 or 10 inches in diameter and extending to a depth of 6 or 7 feet below the surface of the gravel deposits. The well casings were to have been capped at the top and all connected to a main suction. The location proposed for the wells was in one of two sand and gravel bars, one on the Ohio side of the river about three miles above the city, and the other on the Kentucky side opposite the upper end of the city and about three-fourths mile above the pumping station. The more favorable of the two sites was to be determined by results obtained from test wells.

Based on the report submitted by the engineer of the Board, a letter was sent to the superintendent of water works stating that either of the sites selected was favorable so far as absence of local contamination was concerned, but it was pointed out that the scheme of obtaining a satisfactory water supply from shallow wells in the bottom of the Ohio River was one the success of which the State Board of Health was not prepared to predict. The letter went on to say that while a somewhat similar arrangement had proved successful at Gallipolis, there were on the other hand infiltration wells and similar schemes along the Ohio River which were unsuccessful. It was then stated that the State Board of Health did not have information on hand which would warrant its giving an approval of the proposed scheme, but that if the local authorities wished to install test wells and subject them to a suitable pumping test, the Board would undertake to make a thorough investigation. (See annual report for 1906, page 35.)

During April, May and June of 1906, a number of samples from test wells driven at various points in the gravel deposits were sent to the State Board of Health for analysis. All these samples were collected by the superintendent of water works. The results of the analyses indicated in every case a water objectionable from the point of view of hardness, iron content, or sanitary quality. (See annual report for 1906, page 411.) Later test wells were sunk on the Kentucky side of the river, and these gave such promising results that a more complete test was deemed advisable.

On the recommendation of the city's then consulting engineer, Mr. Alexander Potter, a circular wooden crib 10 feet, inside diameter, was sunk in the gravel deposits on the Kentucky side about one mile above the pumping station. (See description, annual report for 1906, page 98.) The crib was placed in about 6 feet of water, the river being at medium low stage, and sunk to a depth of 8 feet into the sand and gravel by dredging from the inside. A pump with a nominal capacity of 500,000 gallons per twenty-four hours was installed upon the top of the crib and a pumping test was continued for twenty days. The rate of pumping was approximately 450,000 gallons per day, which lowered the water inside of the crib to within 2 feet of the bottom, thus creating a filter head of about 11 feet. After thirteen days of pumping, that is, on November 7, 1906, one of the engineers of the State Board of Health visited Ironton for the purpose of making an examination on the ground and collecting samples. The water as obtained from within the crib was satisfactory in every way as regards its physical properties and contained 600 bacteria per cubic centimeter as against 11,300 in the river water, representing a reduction of about 95 per cent. Samples taken at the end of the twentieth day gave 110 bacteria per cubic centimeter as against 2,600 in the river water.

The results above noted were quite promising and were considered by the local authorities as warranting the installation of the infiltration scheme on a large scale. On November 21, 1906, the State Board of Health approved the proposed scheme for obtaining a public water supply from wells sunk in the Ohio River at a point near the Kentucky shore and about one mile upstream from the pumping station; but not being convinced of the entire feasibility of the plan, the Board imposed the following conditions as a part of its approval:

"1st. That complete plans showing detail arrangements of the proposed supply be submitted to the State Board of Health for approval as soon as these plans are made.

"2nd. That a filtration plant, of a design satisfactory to the State Board of Health, be installed whenever this is deemed necessary by said Board.

"3d. That the distance between wells shall be figured in the following manner: The average rate of filtration through the gravel shall be figured at the rate of 2,000,000 gallons per acre per day, and sufficient area shall be provided about each well so that this rate shall be maintained. The cross-sectional area within the wells shall be such that the draft from any well shall not exceed 4 gallons per square foot per minute.

"4th. That a sufficient number of wells be used so that the combined interior cross-sectional area of all the wells shall equal at least 250 square feet.

"5th. That samples of water drawn from the wells be submitted for chemical and bacteriological analyses at intervals not greater than three months."

A few words of explanation should be added relative to the manner of figuring the spacing and area of the wells: The manner of figuring prescribed should not be taken as an indication of the theory of the operation of the system but merely as giving a convenient formula that in the light of information then at hand would give a suitable design. The area of wells was based on the rate of rise in the 10-foot crib, which proved to be 6 inches per minute. Two hundred and fifty square feet would thus yield 1,350,000 gallons per twenty-four hours under the conditions obtaining during the test, and it was believed that with favorable gravel formation the rate could be increased. The 250 square feet required was considered by the engineer of the Board as a minimum, and it was anticipated that additional wells would be added as needed should the yield not prove sufficient.

While the spacing of the wells was based on a rate of filtration of river water into the bar of 2,000,000 gallons per twenty-four hours, the action taking place was not considered one of filtration simply. In fact, it was believed that so crude a filtering medium as the material composing the gravel bar could not be depended on to effect a satisfactory degree of purification even at this low rate. Therefore, if the system was to prove a success, the underflow of the river must become a factor in supplying the wells. With the wells suitably located away from the influence of ground water veins, this underflow should prove much the same in character as the river water as regards its mineral content but should be superior to the river water as regards its physical and sanitary properties.

On January 23, 1907, in conformity with the conditional approval of November 21, 1906, Mr. Alexander Potter submitted completed plans for the new water supply of Ironton. These plans provide for (1) a group of wells; (2) a suction main from wells to pumping station; and (3) a storage reservoir connected with the distribution system.

Group of Wells. There are shown 12 wells arranged in three clusters of four wells each. The spacing from center to center of clusters is 150 feet. Each well consists of a 5-foot length of 48-inch pipe capped at the top. Thus the combined cross-sectional area of all the wells is 150 square feet or 100 square feet less than called for in the conditions of approval imposed by the State Board of Health. The caps for the wells are shown as regular cast-iron pipe plugs excepting that they are provided with a hole in the middle furnished with a hub and of sufficient size to insert a 10-inch cast-iron pipe. The hub furnishes the means of making a tight joint. The 10-inch pipes are made to extend to within two feet of the bottoms of the wells, are provided with flanged caps at the top, and have side outlets just above the tops of the wells. The spacing of the wells in each cluster is such that the center of each well occupies the corner of a 20-foot square. By suitable piping the four wells of each cluster are connected to a 14-inch collector pipe, which in turn enters the

20-inch main suction line. On each 14-inch collector pipe is a check valve which checks the return of water to the wells, and around this check valve is a 10-inch by-pass controlled by a gate valve. This arrangement permits of back flushing each cluster separately. All of the details of the well clusters are directly copied from the Gallipolis installation since it was deemed unwise to deviate from successful precedent in a proposition fraught with so many uncertainties. The bottoms of the wells are shown at elevation 476, or 10 feet below what is described as actual low water mark.

Suction Main. The suction line is shown as approximately 5,000 feet long and laid on even grades sloping continuously to the pumping station.

Reservoir. Two designs for the reservoir are shown on the plans; one calls for reinforced concrete construction and the other for steel plate construction. The location shown for the reservoir is on one of the hills back of the city and at an elevation sufficient to create a pressure of about 60 pounds per square inch at the pumping station."

The plans above described were approved by the State Board of Health on January 23, 1907, provided:

"1st. That the reservoir shown on the plans or a reservoir holding at least 1,000,000 gallons be included in the project and constructed before the water from the new source of supply is offered to consumers; and,

2nd. That a sufficient number of wells be used so that the combined interior cross-sectional area of all the wells shall be equal to at least 250 square feet."

On April 24, 1907, Mr. T. T. Johnson, chairman of a committee of council, requested the State Board of Health to omit that condition of its approval calling for a reservoir as a part of the new water supply. The matter was referred to the chief engineer of the Board for investigation and report. On April 30, 1907, the chief engineer visited Ironton and informally presented his views to the special committee of council and to the city solicitor. These views were later embodied in a report to the Board and in effect argued that since experience at Gallipolis had strongly indicated the advantages of back flushing, a departure from the only successful precedent would be unwise. Acting on the recommendation of this report, the State Board of Health on May 17, 1907, reaffirmed its former action requiring the construction of a reservoir as a part of the new water works system.

Following this it was assumed that the local authorities thoroughly understood the requirements of the State Board of Health and that these requirements would be duly carried out. At this time the Board did not have means for making regular inspections during construction of works which had come before the Board for approval, and it was necessary to depend in a very large measure on the faithfulness of local officials and the ability of the consutilng engineer.

At a later date it was learned from responsible citizens of Ironton that the city officials had decided to ignore the orders of the State Board of Health, not only by omitting the reservoir which had twice been definitely required by the Board, but also by making various changes in the arrangement and connections of the wells. In view of this attitude on the part of the city officials, Mr. Potter severed his connection as consulting engineer and the work was carried forward by the board of public service without the assistance of any trained engineer.

The above matters came directly to the attention of the secretary of the State Board of Health in October 1907, and on the 9th of that month he sent the following communication to the board of public service of Ironton:

"I am informed by one of your reliable citizens that some important changes have been made in the plans for your new water works system since the plans were approved by the State Board of Health; namely, that there is some change in the piping system of the infiltration wells, as shown in the plans of the original plant, and that the gate valves which cut off each cluster are omitted. If this report is correct, revised plans should be submitted to the State Board of Health for approval at once, and you would not be justified in going ahead with the work until such revision had been approved by the Board.

"Hoping to hear from you in reference to this matter, I am,

Very truly yours,

(Signed) C. O. Probst,
Secretary."

The above letter met with no response, not even its receipt was acknowledged by those in authority.

In November 1907, the illegal manner in which the new water supply system was being constructed was again called to the attention of the State Board of Health, and on November 19, 1907, the following letter was sent:

"Board of Public Service,
Ironton, Ohio.

Dear Sirs:—Under date of October 9, 1907, I called attention to a report that had been made to us that some important changes had been made in the plans for your new water works system since the plans were approved by the State Board of Health. I asked that if this report was correct the revised plans be submitted to this Board for approval. I have heard nothing from you in regard to this. One of our engineers was recently in Ironton, and learned from apparently a reliable source that in constructing your new water works you are deviating in two essential particulars from the plans as approved by the State Board of Health. These are as follows:

"1. The arrangement of the wells has been changed, and the hydraulic valves which were to permit their proper control have been eliminated.

"2. The size of the reservoir has been greatly reduced from the capacity of one million gallons which was specified in the approval of the State Board of Health. The reservoir which you are now building will be entirely inadequate for the purpose for which it is intended, i.e., furnishing water for back flushing and supplying the city with water while the process of back flushing is being carried on.

"I also receied a letter from Mr. Collett, secretary of your Business Men's Club, which corroborates the report. If you are proposing to construct a flush tank which will hold but fifty-one thousand gallons of water, this would be entirely inadequate for flushing purposes.

"We shall expect you to build this plant in accordance with the plans that have been approved by the State Board of Health, and you may expect to have trouble unless this is done.

Yours truly,
(Signed) C. O. Probst,
Secretary."

This letter likewise received no response, and the board of public service proceeded with the construction of the work according to their own notions.

On April 30, 1908, one of the engineers of the State Board of Health visited Ironton for the purpose of gaining some information regarding the manner in which the improved water supply was being installed. He noted in his report under date of May 6, 1908, that various changes in plan had been made over the plans as approved which changes may be described as follows:

(1) The wells instead of being arranged in five clusters of four wells all on one side of the main suction pipe, were arranged in ten clusters of two wells each with five clusters placed to either side of the main suction. Furthermore, the check valves and by-passes controlled by gate valves were abandoned, thus making it impossible to flush the clusters separately.

(2) For the reservoir there was substituted a standpipe which served the double purpose of reservoir and valve chamber. This standpipe is shown located near the water's edge at the pumping station. It has a capacity of about 51,000 gallons. In the bottom of the standpipe is placed a complex system of valves and piping which provides one connection for the direct intake pipes, one connection for the 20-inch suction main from the group of wells, and three pump connections. By cross-connections it is made possible to take water with any pump from either suction. Provision is made for filling and emptying the standpipe with the regular service pumps, and means are provided whereby the full standpipe may be discharged into the suction main from the wells. An additional pipe 8 inches in diameter is provided whereby direct pressure from the distribution system may be applied to the suction main.

At the time of this visit about 2000 feet of the suction main had been laid, which was the extent of the work completed.

For some reason the report based on this visit was never transmitted and no action by the Board was taken.

During the latter part of 1908, the mayor of Ironton appointed a committee of investigation to examine into the water works situation.

As a part of its investigation, the committee engaged the services of Mr. John W. Hill of Cincinnati to examine into the engineering phases in connection therewith. Mr. Hill submitted on January 5, 1909, a searching report which among other things brought out very clearly the following points.

(1) The sand and gravel formation in which the wells are located is not suitable for the purpose due to conglomeritic formations at the surface and at depths of several feet. With competent engineering supervision the unsuitability of the material would have been readily detected.

(2) The well system was improperly designed in that there is no adequate storage for flushing the wells nor means for flushing the various clusters of wells independently.

(3) The system as installed is not capable of furnishing a quantity of water that will meet with the demands of the city.

(4) The construction work is very irregular and careless, a condition inexcusable in view of the simplicity of the work.

(5) A mistake was made in not employing a competent engineer to supervise the work.

(6) The work, even had it been done in a workmanlike manner, cost the city somewhat over $20,000 more than it should have cost.

In response to a letter received from C. H. Ketter, then president of the board of public service, one of the engineers of the State Board of Health visited Ironton on February 3, 1909. At this time samples of water were obtained from the river, from the supply to the city as ordinarily furnished, and from the wells. The supply to the city as ordinarily furnished represents a greater or less mixture of river water with the well water. At the request of the engineer, a set of samples was forwarded to Columbus by the water works superintendent, which samples represented the well supply at a higher stage of the river than obtained at the time of the engineer's visit. The results of these analyses are embodied in the accompanying table of analyses, which also includes an analysis of the well water of more recent date. Based on the engineer's report, the following letter was sent:

Columbus, Ohio, March 10, 1909.

"Mr. C. H. Ketter,
President, Board of Public Service,
Ironton, Ohio.

"Dear Sir:—Enclosed you will find a table showing results of analyses of samples recently collected by one of our assistant engineers; also the analysis of a sample sent in by you on February 23rd.

"The evidence obtained during the examination on February 3rd, made by our representative, shows that at certain river stages it is impossible to obtain more than 1,500,000 gallons of water daily. The analyses of water from wells collected at that time show that such water was contaminated and that it further contained objectionable quantities of iron in solution. This iron when exposed to the air will precipitate out and stain plumbling fixtures.

"On the other hand, you will note by the analysis of the sample collected by you at the high stage of the river that the quantity of the iron in the well is very much less and that the water is in other particulars very satisfactory. If water as represented by this sample could be obtained at all times, your problem would be solved. This, however, is impossible. In view of the present conditions, it is imperative that you take immediate steps toward securing a safe and abundant supply. This might be done in one of three ways:

"First, improve your present system, following some plan which will increase the efficiency of the system as now installed so that a safe water may be obtained in abundant quantities.

"Second, by loosening the material over the wells with the idea of obtaining clarified but not pure water in sufficient quantities, and by purifying such water with an artificial filter.

"Third, by abandoning entirely the work you have done and installing a filter plant, using raw river water.

"In view of the gravity of the situation at Ironton, I would suggest that your local officials come to Columbus, and confer with the engineering department and myself as to the wisest course to pursue.

Very truly yours,

(Signed) C. O. Probst,
Secretary."

On March 18, 1909, representatives of the board of public service came to Columbus for a conference with the secretary and the engineers of the Board. At this conference there was discussed the feasibility of increasing the yield of the wells by breaking up the conglomerate formation near the wells, and it was agreed that an attempt in this direction would be advisable.

On March 24, 1909, pursuant to the above mentioned confernce, there was received a communication from Mr. C. H. Ketter accompanied by plans, requesting formal approval of the project for increasing the yield of the well system by breaking up the conglomerate formation. The portion to be broken up lay over the wells and roughly occupied an area 25 feet wide and 750 feet long.

The matter was referred to the chief engineer of the State Board of Health who reported relative to same March 27, 1909. In this report the position was taken that while the proposed breaking up of the conglomerate might not result in effecting a bacterially pure water, it would increase the yield of the wells and permit of obtaining a clarified water which would be of assistance in obtaining a further purified supply by means of filtration. Acting on the recommendations of its chief engineer, the State Board of Health gave conditional approval of the proposed scheme, which approval was embodied in the following letter:

"Columbus, Ohio, April 1, 1909.

"*Board of Public Service, Ironton, Ohio.*

"Dear Sirs: — The State Board of Health has considered yor application for the approval of a proposed improvement of your infiltration system by 'dredging and breaking up the hardpan outside the pure water well clusters in the Ohio River at Ironton, Ohio,' as shown on plan and description submitted by Mr. C. H. Ketter, president of your board of public service, on March 24, 1909.

"You are hereby notified that said plan has been approved with the understanding that should the proposed improvement not result in securing a bacteriologically safe water, steps shall be immediately taken toward further improving the supply.

Very truly yours,
(Signed) C. O. Probst,
"By order of the Board." *Secretary.*"

In August of 1909 the conglomerate was broken up practically as intended, but no material increase in the yield of the wells was observable.

ACCOUNT OF RECENT INVESTIGATIONS MADE AS A RESULT OF COMPLAINT UNDER THE BENSE ACT.

The unsatisfactory state of affairs respecting the water supply was the subject of complaints to the State Board of Health by Dr. Lester Keller, a member of the local board of health and a member of the special investigating committee already referred to. In answer to these complaints, the secretary of the State Board of Health suggested the advisability of bringing the matter before the Board by suitable petition under the Bense Act. Acting on this suggestion, the resolution quoted in the first portion of this report was submitted.

The investigation disclosed conditions for the most part as already described and which may be summarized as follows:

The arrangement of the group of wells was materially altered from that shown on set of plans approved by the State Board of Health. The most important alteration consisted in the arrangement of the wells in clusters of two instead of clusters of four, and the elimination of means for backflushing the clusters separately. The work has been done in an irregular and unworkmanlike manner notwithstanding its simplicity. Most serious in this connection is the fact that the bottoms of the wells have been placed from two to three feet higher than shown in the original plans. It is said that it became necessary to place the wells at a higher elevation because a hard substance was encountered at the depth originally proposed for the bottoms of the casings. However, the discovery of a stratum of hard substance of any considerable area should have at once caused those in charge to cease work until the gravel bar could be further prospected. It may be noted that no such hard substance or other detrimental irregularities were reported as having been encountered in sinking the original 10-foot test crib.

The 20-inch suction main from wells to pumping station has not been laid to even grade as called for in the original drawings, and it is further the opinion of many who are familiar with the Ohio River that the pipe is not laid with sufficient cover to make it secure against ice action.

The size of the standpipe used for flushing the system of wells is so small that adequate flushing is impossible. Further, the flushing is very unevenly distributed among the several clusters of wells; while the omission of check valves and by-passes on the collector pipes from each cluster precludes the possibility of flushing the clusters separately. There being no storage on the distribution system as provided in the plans approved by the State Board of Health, it becomes necessary to pump raw river water into the mains during periods of flushing. The flushing of the wells is also interfered with by the compactness of the gravel deposits, which by not giving relief to the wash water pressure cause the wells to be forced upward out of place.

That the well system is not capable of meeting the demands of the city is illustrated by the fact that it is possible to derive the entire supply from a system of wells only when the river has reached a 20-foot stage or a rise of fully 15 feet above ordinary low water and about 19½ feet above extreme low water.

The river water in the raw state is not fit for domestic consumption as it is evidenced by the table of vital statistics hereto appended and by numerous analyses on file in the office of the State Board of Health.

The extension of the well system is not feasible because of the unsuitability of the material of which the gravel bar is composed, and because of the defective design relating to backflushing.

It is not possible with the information at hand to estimate closely the cost of a purification plant, but a liberal rough estimate would place the figure at not to exceed $75,000. This sum can readily be raised by council under the provisions of the Bense Act since the present bonded indebtedness of $155,500 represents but 2.8 per cent. of the tax duplicate.

At its meeting held January 19, 1910, the State Board of Health adopted this report and made the following finding: "The well system of Ironton is not capable of meeting the demands of the city; The Ohio River water in raw state is not fit for domestic consumption, and the extension of the well system is not feasible because of the unsuitability of the material of which the gravel bar from which the water is obtained is composed."

The Secretary was instructed to cite the authorities of Ironton to appear before the Board at its meeting to be held February 16, 1910, to show cause, if any, why the city should not be required to have in service before June 1, 1911, a public water supply obtained in either of the following ways:

1st. By purification of water from the Ohio River in a purification plant of design and construction to be first approved by the State Board of Health; or,

2nd. By the introduction of a new supply, also to be first approved by the State Board of Health.

After giving representatives from Ironton an opportunity to be heard on the 16th of February, further action was postponed until the April meeting of the Board, it being agreed that a conference of the local officials, i. e., the council, the mayor, the director of public service, the board of health and the city solicitor, would be held and definite plans for improving their public water supply would be submitted to the State Board at that time.

The city officials failed to prepare any definite plan for the time set, and at the meeting of the Board on April 20, 1910, the time for making plans was extended to June 29th. At the meeting held on that date, it was reported that consulting engineers had been engaged, and the Board took no action.

August 31st, the consulting engineers reported on their investigation of the infiltration plant at Ironton. They did not advise further use of the present collecting system and did not feel warranted in recommending abandonment of the plant without further tests. They recommended "That the tests be made to determine the feasibility of collecting a satisfactory water supply by horizontal units; and the installation of a test unit, which if satisfactory may embrace a system capable of supplying the entire city."

October 3, 1910, the following resolution was adopted by the Board of Health of Ironton, and a copy sent to the State Board of Health:

> WHEREAS, Fifteen thousand people of Huntington, W. Va., twenty miles above our intake, twenty-five hundred people of Catlettsburg, Ky., ten miles above our intake, and eight thousand people of Ashland, Ky., three miles above our intake for our water works are supplied with a sanitary sewerage system, discharging no less than twelve and one-half tons of solid human excrement directly into the river daily, and
>
> WHEREAS, Ironton gets its water supply direct from the Ohio River without filtration or purification, and
>
> WHEREAS, The filter plant installed over two years ago has proven to be a failure, has fallen to pieces, has been condemned by an expert engineer hired for the purpose of examination, and has been abandoned, and
>
> WHEREAS, This board of health over one year ago condemned the water supply of the city of Ironton, declaring it a menace to life and health, and asked relief from the State Board of Health under the Bense Act, and
>
> WHEREAS, The city of Ironton has not been able to give such relief as its representatives before the State Board of Health last February promised it could do;
>
> *Be it Resolved,* That the board of health of Ironton, Ohio, again condemns the water supplied to the city of Ironton as a menace to life and health, and urges the State Board of Health to take immediate steps to give us relief under the Bense Act.
>
> By order of the Board of Health.
>
> (Signed) T. J. HAYES,
> *Clerk.*

At a meeting held October 19th, the city authorities appeared before the State Board of Health and urged that they be granted further time in which to put in a test well. Further action was postponed and thirty days time granted the authorities to proceed with the test.

At a meeting of the board of Health of Ironton, held January 2, 1911, the following resolution was presented and adopted and the clerk of the Board instructed to forward a copy to the State Board of Health:

> WHEREAS, Ironton is supplied with water direct from the Ohio River;
>
> WHEREAS, Ironton officials have made no progress toward securing a better water supply;
>
> WHEREAS, There are more than twenty-five (25) cases of typhoid fever in Ironton under treatment at this time;
>
> WHEREAS, The Ohio River water is about as filthy at this time as it can be and we consider it the source of infection;
>
> *Be it resolved,* That the board of health of Ironton, Ohio, again condemn the raw Ohio River water as a menace to life and health and urge the State Board of Health to take immediate steps to give us relief under the Bense Act.
>
> By order of the Board of Health.
>
> (Signed) T. J. HAYES,
> *Clerk.*

This was received by the State Board of Health January 5, 1911.

January 20, 1911, the chief engineer visited Ironton to ascertain from the local officials what progress had been made toward securing a safe water supply for that city. He reported in part as follows:

At a council meeting held October 31, 1910, the sum of $1200 was made available for use in making the test, and on the following day the director of public service advertised for bids. The contract was awarded to Messrs. Burgess and Long, consulting engineers of Columbus, and their plans were received by the director on November 30th, but, it is said, on advice of the city solicitor, were not opened or officially accepted pending the furnishing of a bond acceptable to the city officials in the sum of $500. This caused a delay of three weeks; and was a somewhat unusual procedure, especially as the contract price for engineering services was but $150.

December 21, bids were asked for, first, (without advertisement) for most of the material for installing the test unit; and second, the work of installation of the test unit was advertised, the bids to be received on January 11, 1911. At the date fixed, however, no bids were received as no contractor cared to bid on the work on account of the high stage of the river.

No contract work on the test unit has therefore been done, and if the present season is an average one, the river will remain too high for work until May or June, while if the season is similar to that of the past year or two, it may be impracticable to install the test unit before August.

ACTIVITY OF LOCAL OFFICIALS IN PROCEEDING WITH TESTS SINCE THE OCTOBER 1910 MEETING OF THE STATE BOARD OF HEALTH.

It will appear from the above that the local officials have apparently omitted no legal technicalities in the steps and progress toward installing a test unit. They cannot be blamed for strictly observing the law in their official acts; but in this case, which was one of emergency, it does not seem justifiable that they should go to the extraordinary precaution of requiring a $500 bond on a $150 contract for engineering services. Furthermore, the law allows expenditures of under $500 to be made without advertising. It seems probable, therefore, that the city might have remained within its legal authority and still have taken advantage of the excellent weather and low water conditions which existed for some weeks after the time of the October Board meeting; and might have at once secured the necessary engineering services and necessary labor without advertisement, in the same manner that it expects after long delay, to purchase the material for the test.

In brief, it may be said that poor management has been shown in going to the expense and delay of advertising for work which the city could have at least endeavored to do in a legal manner without advertising. Such a delay has resulted in the postponement of the test from eight months to a year.

Discussing the matter from the technical and practical sides, it should be remembered that even should this test be made and show good results, it would not be by any means a guarantee of the continued success of a permanent plant of capacity to supply the city; and it may be mentioned in passing that the operation of infiltration systems such as the one contemplated by Ironton, cannot be controlled as can a filtration plant of standard accepted design. Also the possibility of the material in the bar (which has been pronounced unsuitable by several experts) becoming either unduly clogged or being washed away, means that even though the contemplated system be at first satisfactory, the city would be constantly in danger of having a polluted water suddenly and without warning delivered to consumers.

During the recent visit, furthermore, it was stated by a member of the local board of Health there was at the present time an unusually large number of cases of typhoid fever; in fact, enough to warrant the situation being classed as a mild epidemic. This member of the local board of health stated that he would present to the Board at its meeting on January 25, 1911, accurate data in regard to the typhoid situation, which data he is preparing.

From an engineering standpoint and disregarding the delay and inaction on the part of the local officials during the past year toward securing a better water supply, it is believed that it is for the best sanitary interests of the city to install a filtration plant, and that the State Board of Health would be entirely warranted in proceeding further under the Bense Act and ordering the city to install such plant, the same to be in operation before December 1, 1911.

At a meeting of the State Board of Health held January 25, 1911, the reports of the Board's committee and of its chief engineer were approved and an order was adopted requiring the city of Ironton to install and have in operation a water filtration plant satisfactory to the State Board of Health on or before December 1, 1911.

An order was prepared and submitted to the Governor and the Attorney General February 18, 1911.

In May 1911, the Governor notified the Secretary that he and the Attorney General had withheld approval of the order of the Board to give an opportunity for the city to carry on the proposed tests.

It will be seen, therefore, that the tests which the Board voted to permit in October 1910, were greatly delayed.

Further complaints were received and at a meeting held May 9, 1912, the State Board of Health adopted a resolution directing the officials of Ironton to appear before the Board at its meeting to be held July 18, 1912 with a definite plan for improvement of the public water supply to a standard which would satisfy the requirements of good sanitation.

At its meeting July 18, 1912, after giving representatives of the city a hearing, the State Board of Health instructed its Secretary to notify the mayor and council that it would expect the city to install a test unit as soon as the stage of the river would permit.

Being notified that the test well had been completed, on November 25, and 26, 1912, the chief engineer and one of the assistant engineers visited Ironton and made an examination of a test well installed preliminary to the development of the proposed new water supply. The examination included observations of the methods of conducting the test and the analyses of a number of samples both in the field and in the laboratories of the State Board of Health. The following report by the investigating engineers was submitted:

Description of Test Unit. The infiltration wells installed in 1908 comprise twenty vertical units connected to a common suction leading to the pumping station. The wells are cylindrical in shape, 4 feet in diameter by 5 feet in depth and are open at the bottom, resembling bells. The entire supply reaches the wells through the bottoms. The test unit comprises a 12 foot length of 42 inch cast iron pipe, set horizontally in the deposits, which form the bed of the Ohio River. The test unit is placed near the existing units but somewhat farther from the shore of the stream. The 42-inch cast iron pipe is plugged at one end, capped at the other, and is drilled with perforations on the lower side which admit the supply. The suction pipe is laid on the invert of the unit. The 42 inch pipe is placed upon timber supports which rest upon the hardpan underlying the river deposits. These have an average thickness of 10.5 feet. The depth of the water at the site of the test unit is about 5 feet when the river is at a 6 foot stage on the government gage, and at extreme low water the depth is approximately 2 feet. A dam is to be placed in the Ohio River below Ironton for the purpose of maintaining the stage of the river at 9 feet on the government gage. With the completion of this dam the depth of the river at the test unit will be at least 8 feet at all times. Considerable difficulty was encountered in installing the test unit on account of the stage of the river and this difficulty was advanced as the main reason for the delay in the installation. It follows, therefore, that the increased permanent stage of the river will render very difficult the installation, maintenance, and extension of a system of wells.

Description of Test. The test well installed recently was pumped by means of a horizontal, double acting, McGowan steam pump with cylinder dimensions, 8 inch diameter by 24 inch stroke. The pumping was started on Monday, November 18th, and except for an intermission of 6 hours on November 19th, was carried on continuously until 3:45 P. M., November 26th. The rate of pumping from November 19 to November 25, 1912, at 2:00 P. M. was approximately 566,000 gallons per 24 hours. At this time the rate was lowered for a short period to 255,000 gallons, and at about 3:00 P. M. it was increased to 382,000 gallons. This rate was maintained constantly until 10:20 A. M. November 26th, when it was increased to approximately 497,000 gallons. At 12 noon, November 26th, the rate was further increased to 636,000 gallons, which was maintained until the termination of the test.

Samples for the determination of the quality of the water were collected at various times from 2:00 P. M. November 25th until 3:30 P. M. November 26th. The results of the field and laboratory examinations are given in tables appended to this report. The quality of the Ohio River water remained quite constant during the progress of the test. The river being at a rather low stage and falling, contained less than its average content of suspended matter, organic matter, and bacteria. The physical characteristics of samples taken from the test well are in general satisfactory, no turbidity being found except when the well was pumped at a high rate. The organic content of the water from the test well was found to be considerably lower than that of the river. The hardness was somewhat higher in all the samples and was found to increase with the higher rates of pumping. This would indicate an increased yield of ground water. The iron content in the water from the well was found to be low especially with low rates of pumping, but at higher rates the iron content increased appreciably. The bacterial examination of the water from the test well disclosed entirely unsatisfactory results. In eight of nine samples collected from the well and inoculated in the field, B. coli were found in one cubic centimeter portions. In six of seven samples shipped to the laboratories, B. coli were found in one cubic centimeter portions, while in the other case the organism was present in a 10 cubic centimeter portion. The bacterial examination showed an average total count of 146 per cubic centimeter with an increase taking place at high rates of pumping.

SUMMARY.

The following salient statements summarize the results of the observations of the test.

1st. Owing to the stage of the Ohio River its quality at the time of the test was above average. The results, however, show that even under the most favorable conditions the water in its raw state is unfit for domestic use.

2nd. The observations during the test were favorable as regards the quantity of water pumped.

3rd. The results of the analyses indicate that the water drawn from the test unit is largely from ground sources and that but a small amount of river water reaches the well by infiltration. They also indicate that the ratio of filtered river water to ground water decreases with increased rate of pumping.

4th. The bacterial examination of samples from the test unit showed uniformly unsatisfactory results with all rates of pumping, which indicate that water unsuitable for domestic use was obtained.

ACTIONS OF THE BOARD.

At a meeting held December 12, 1912, the State Board of Health considered this report, and found that the test of November 18th to November 26, 1912, authorized by the Board October 20, 1910, gave unsatisfactory results. It was voted to send a copy of the report to the Governor and the Attorney General and to the Mayor and Council of Ironton, and to request that the Governor and Attorney General consider the report with a view to approving the order transmitted to them under date of February 18, 1911.

The Attorney General requested the Board to renew its order, fixing a date for compliance therewith. The Board accordingly, at a meeting held February 20, 1913, adopted a resolution ordering the city of Ironton to install and have in operation a water filtration plant, of a design satisfactory to the State Board of Health, on or before eighteen months after the order was approved by the Governor and Attorney General, and instructed the Secretary to transmit a copy of the order with the proceedings thereon to the Governor and Attorney General.

The following order duly approved, was sent to the Mayor and Council of Ironton April 23, 1913:

ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF IRONTON.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the conditions of the public water supply of the city of Ironton, Lawrence County, Ohio, as set forth in a complaint, in writing, made to said State Board of Health by the board of health of the city of Ironton, as required by Section 2 of an act of the General Assembly of Ohio entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution," passed April 7th, 1908, (99 O. L. p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health after investigating the conditions complained of, found that the well system of Ironton is not capable of meeting the demands of the city; that the Ohio River water in raw state is not fit for domestic consumption, and that the extension of the well system is not feasible because of the unsuitability of the material of which the gravel bar from which the water is obtained is composed; and

WHEREAS, Acting pursuant to the requirements of the act aforesaid, said State Board of Health thereupon on the 27th day of January 1910, notified the authorities of Ironton of its said findings and gave said city an opportunity to be heard before said Board; and

WHEREAS, On the 16th day of February 1910, pursuant to said notice, there appeared before the State Board of Health C. W. Bick, president, D. J. James, member, and H. M. Paul, clerk, of the city council; Dr. W. E. Pricer, O. E. Irish, city solicitor, Dr. A. Clark Lowry, member of the General Assembly, H. H. Campbell, ex-member of council; C. H. Lucas, member of the board of trade; Mayor C. W. Golden and Dr. Lester Keller, member of the board of health, representing the city of Ironton; and the matters as contained in said complaint were discussed and argued by them in the presence of said Board; and

WHEREAS, After such hearing and argument the State Board of Health postponed further action in the matter until its meeting to be held April 20th, 1910, when the authorities of Ironton were to present to the said Board a definite plan for improving the water supply of the city; and

WHEREAS, On the 20th day of April a resolution adopted by the city council of Ironton was presented, relative to the improvements of the public water supply, and an extension of time was made for presenting definite plans for making the necessary improvements in the water supply of Ironton to June 29th, 1910; and

WHEREAS, On the 29th day of June, 1910, a communication was presented to the State Board of Health from the director of public service of the city of Ironton, stating that he had on the 14th day of May 1910, entered into a contract with the firm of Messrs. Burgess, Kimberly and Long of Columbus, consulting engineers, for the examination of the filter beds in the Ohio River from which the city of Ironton obtains its water supply; examination and analysis of water drawn therefrom; examination of well clusters and report upon the efficiency of the wells, the advisability of increasing their number or changing their location and recommendation for the improvement of the water supply of the city, such examination to be begun as soon as the stage of water in the Ohio River would permit, and be carried on without unnecessary delay, and accomplished within a period of six days; and

WHEREAS, On the 19th day of October, 1910, there appeared before the State Board of Health Mr. David J. James, Mr. Adolph Schubert and Mr. Moore, councilmen, and Mr. H. M. Paul, clerk, representing the city of Ironton, and urged said Board to grant further time in which to put in a test well, as recommended by the consulting engineers, and an extension of thirty days time was given; and

WHEREAS, Another complaint being received from the Board of Health of Ironton on January 5th, 1911, concerning the condition of the public water supply of Ironton, the chief engineer of the State Board of Health visited Ironton and investigated and reported upon the progress made in the improvement of the water supply for that city; and

WHEREAS, On the 25th day of January 1911, Mr. David James, member of council, and Mr. H. M. Paul, clerk, representing the city of Ironton, appeared before the State Board of Health at a regular meeting and were given a hearing in regard to the failure on the part of said city to put in a test well in compliance with the former action of the said Board; and

WHEREAS, The State Board of Health having before it the report of its committee and the report of its chief engineer, found and determined that the following improvements and changes were necessary and should be made; to-wit: That the city of Ironton be required to install and have in operation a water filtration plant, satisfactory to the State Board of Health, on or before December 1st, 1911; and

WHEREAS, On motion duly seconded, the findings and order of the said State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon; and

WHEREAS, The Governor and Attorney General, on or about May 27th, 1911, gave to the city of Ironton an opportunity to be heard with reference to said order and granted to said city an extension of time as evidenced by the following telegram:

COLUMBUS, OHIO, May 27, 1911.

To the Mayor and City Council,
Ironton, Ohio.

We have decided to delay action on State Board of Health's order until proposed changes in present water supply system can be perfected and tried, so you may proceed at once on that basis.

(Signed) JUDSON HARMON, *Governor,*
TIMOTHY S. HOGAN, *Attorney General.*

WHEREAS, Nothing definite having been done by the city of Ironton to improve the quality of the public water supply, and complaints having again been made in regard to the quality of said supply, the State Board of Health, at a regular meeting held May 9th, 1912, adopted the following resolution:

"*Be it resolved,* That the officials of Ironton be directed to come before the State Board of Health at or before its regular meeting to be held July 18, 1912, with a definite plan for improvement of the public water supply to a standard which will satisfy the requirement of good sanitation."

Pursuant to a notice the following representatives of the city appeared before the Board at its meeting July 18th, 1912: D. J. James, member of council; F. A. Ross, clerk of the department of public service; and Clyde K. Turley, clerk pro tem, of council; and the matter was argued by said representatives and the State Board of Health; and the Board instructed its Secretary to notify the mayor and council that the city of Ironton would be expected to install a test unit as soon as the stage of the river would permit and such instructions were sent to the officials under date of July 19th, 1912, and

WHEREAS, On November 19th, 1912, the State Board of Health was notified by the clerk of council that a test well had been completed and was ready to be tested. Pursuant to such notice representatives of the State Board of Health went to Ironton, made the necessary tests and examinations and reported to the State Board of Health at a regular meeting held December 12th, 1912, that said tests and examinations showed that a water of unsatisfactory hygienic quality was obtained from said test unit.

Thereupon, On the motion duly seconded, the State Board of Health adopted the report and findings of its representatives and ordered its Secretary to transmit to the Governor and Attorney General a copy of the report and the findings of the Board with the request that immediate attention be given to the former order filed with said state officials; and

Whereas, The matter having been presented to the Attorney General he requested that the State Board of Health renew its order and fix a date for compliance therewith, now therefore

The State Board of Health in session at a regular meeting, on February 20, 1913, adopted the following resolution:

Be it resolved by the Ohio State Board of Health, That the city of Ironton, Lawrence County, Ohio, be and is hereby ordered to install and have in operation a water filtration plant, of a design satisfactory to the State Board of Health, on or before eighteen months after this order is approved by the Governor and Attorney General; that the Secretary of the State Board of Health be instructed to transmit a copy of this order with the proceedings thereon to the Governor and Attorney General for approval and when such order is approved that he transmit a copy of the order and proceedings thereon to the mayor and council of the city of Ironton.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of Ohio, and that the proceedings above set forth were duly had before said Board as shown by the minutes thereof.

E. F. McCampbell, M. D.,
Secretary of State Board of
Health of the State of Ohio.

February 26, 1913

Columbus, Ohio, April 23, 1913.

The foregoing findings and order of the State Board of Health having been examined by us respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 23rd day of April, 1913.

James M. Cox,
Governor of Ohio.
Timothy S. Hogan,
Attorney General of Ohio.

EXAMINATION OF WATER FROM IRONTON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.
8343	1909 Feb. 3	......	110	......						
8341	Feb. 3	......	30±	......						
8342	Feb. 3	......	15±	......						
8344	Feb. 3	......	15±	......						
8358	Feb. 23	none	none	none	none	1.30	.02	.002	.01	none
9274	1910 Jan. 7	trace	trace	none	none	0.50	.006	.002	trace	trace

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation. Total.	Residue on Evaporation. Loss on Ignition.	Iron.	Bacteria Number per cc.	Bacteria Colon Present.
8343	13.5	23	40	320	30	4	8400	
8341	12.5	48	35	240	18	2	2600	
8342	10.5	85	37.5	196	16	0.6	420	
8344	14.5	86	50	200	24	0.8	360	
8358	7.0	46	80	136	22	0.2	160	Not in 50 cc.
9274	18.0	57	65	160	28	0.7	264	Not in 10 cc.

Source of Samples.	*Colon Bacilli.*
8343 — Water from Ohio River.	Present in 0.3 cc.; abs. in 0.1 cc.
8341 — Usual water supply.	Present in 1.0 cc.; abs. in 0.3 cc.
8342 — Water from wells.	Present in 3.0 cc.; abs. in 1.0 cc.
8344 — Water from wells.	Present in 3.0 cc.; abs. in 1.0 cc.
8358 — Public water supply obtained entirely from wells.	Absent in 50 cc.
9274 — Infiltration wells in Ohio River.	Absent in 10 cc.

EXAMINATION OF WATER FROM IRONTON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.
	1912									
11941	Nov. 26	16	18	dist.	none	3.07	.078	.054	0	.2
11943	Nov. 26	14	14	dist.	none	3.22	.058	.056	0	.2
11952	Nov. 26	14	18	dist.	none	2.47	.068	.056	.0002	.2
11946	Nov. 26	14	18	dist.	none	2.03	.074	.074	0	.2
11947	Nov. 26	10	18	dist.	none	1.98	.064	.064	0	.2

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation Total.	Residue on Evaporation Loss on Ignition.	Iron.	Bacteria Number per cc.	Bacteria Colon Present.
11941	17.1	35.	35.	172.	50.	1.7	1700	Pos.—1 cc.
11943	17.2	31.	32.5	155.	44.	2.4	1200	Pos.—1 cc.
11952	17.5	31.	40.	160.	32.	2.4	....	No bacterial sample.
11946	23.5	28.	50.	194.	41.	2.4	340	Pos.—1 cc.
11947	23.	29.	55.	190.	40.	2.2	790	Pos.—1 cc.

Source of Samples.

11941—8 A. M., Ohio River, near test well.
11943—9 A. M., Ohio River, near test well.
11952—2:30 P. M., Ohio River, near test well.
11946—1:30 P. M., tap at pumping station.
11947—2 P. M., tap at Olive Hotel.

EXAMINATION OF WATER FROM IRONTON.

PARTS PER MILLION.

Sample Number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Oxygen Required.	Nitrogen as Albuminoid Ammonia.	Nitrogen as Free Ammonia.	Nitrogen as Nitrites.	Nitrogen as Nitrates.
	1912									
11940	Nov. 26	6.	none	none	sl. musty	.64	.042	.018	0	.2
11942	Nov. 26	7.	none	trace	none	.59	.050	.012	0	.2
11944	Nov. 26	9.	none	trace	none	.54	.034	.018	0	.2
11945	Nov. 26	6.	none	trace	none	1.48	.020	.022	0	.2
11951	Nov. 26	8.	2.	vy. sli.	sl. musty	.49	.034	.028	0	.2
11953	Nov. 26	none	7.	slight	sl. musty	.64	.030	.056	.0002	.2

Sample Number.	Chlorine.	Alkalinity.	Incrustants.	Residue on Evaporation Total.	Residue on Evaporation Loss on Ignition.	Iron.	Bacteria Number per cc.	Bacteria Colon Present.
11940	15.4	63.	45.	182.	50.	.1	61	Pos.—1 cc.
11942	16.3	63.	38.5	174.	47.	.2	50	Pos.—1 cc.
11944	15.9	62.6	45.	178.	35.	.2	468	Pos.—1 cc.
11945	15.6	66.4	42.5	195.	30.	.3	155	Pos.—1 cc.
11951	15.5	63.	38.5	171.	21.	.7	690	Pos.—10 cc.
11953	15.3	63.	42.5	178.	23.	1.1	430	Pos.—1 cc.

Source of Samples.

Sample No.	*Time.*	*Pump Speed. R. P. M.*	*Temperature Deg. C.*
11940	8:00 A. M	32	11.25
11942	9:00 A. M	30	11.0
11944	10:00 A. M	30	11.0
11945	11:30 A. M	41	11.0
11951	2:30 P. M	52	11.5
11953	3:00 P. M	53	12.0

TABLE OF VITAL STATISTICS FOR IRONTON.

Year.	Population.	Total Deaths.	Total Deaths per 100,000 Population.	Typhoid Deaths.	Typhoid Deaths per 100,000 Population.
1890	10,939	128 (7 mos.)	2,000	6	55
1891	11,032	175	1,590	6	54
1892	11,125	163	1,470	3	27
1893	11,218	205	1,820	6	53
1894	11,310	162	1,430	9	80
1895	11,403	200	1,760	7	61
1896	11,496	205	1,780	11	96
1897	11,589	180	1,560	12	104
1898	11,682	184	1,570	11	94
1899	11,775	198	1,690	11	93
1900	11,868	180	1,520	10	84
1901	11,961	238	2,000	7	59
1902	12,054	228	1,900	7	58
1903	12,147	143	1,180	11	91
1904	12,240	162	1,320	4	33
1905	12,333	205	1,670	6	49
1906	12,426	231	1,860	11	88
1907	12,519	231	1,870	13	104
1908	12,612	143	1,110	9	71
Average	....	192	1,638	8	71

REPORT ON INVESTIGATION OF POLLUTION OF THE ROCKY RIVER AT LAKEWOOD.

On January 6, 1913, a resolution of the council of the village of Rocky River was received. This resolution complained of the pollution of Rocky River by the sewage and effluent of the sewage treatment works of the city of Lakewood.

The resolution was referred to a committee consisting of Dr. Wm. T. Miller, member, and the chief engineer, and an investigation was made on February 13, 1913. Subsequent to this investigation, at a meeting held February 20, 1913, the Board adopted the report of its committee and the following findings:

"1st. That the sewage treatment works of Lakewood is seriously overworked and cannot be expected to permanently treat to a satisfactory degree the large volume of sewage received.

"2nd. That immediate steps should be taken by the city of Lakewood to improve conditions attending the disposal of sewage, and that an expert should be employed to devise plans either for enlarging the existing installation or installing an entire new plant with an effluent discharge into Lake Erie.

"3rd. That the water supply intake of Rocky River is unsuitably located and that the water purification plant does not produce a satisfactorily purified water at all times; and that the intake and plant were installed without the approval of the State Board of Health.

"4th. That the intake should be extended to Lake Erie and raw water obtained at a point where only a mildly polluted water can be secured."

After receiving notification of this action of the State Board of Health, the city of Lakewood took no steps to secure plans for improving the conditions, and at a meeting of the State Board of Health held May 15, 1913, the resolution of the council of the village of Rocky River, before mentioned, was again referred to the aforesaid committee. On June 27, 1913, the chief engineer visited Lakewood and examined the sewage treatment plant. On July 17, 1913, one of the assistant engineers examined the condition of Rocky River below the sewage treatment plant of Lakewood. The following report is herewith submitted:

The conditions attending the disposal of sewage at Lakewood have been completely described in previous reports of the State Board of Health. Only a brief review of the situation will therefore be necessary.

Lakewood is a city with a population of 20,000 located in Cuyahoga County, immediately west of the city of Cleveland and east of Rocky River. The growth of the city during the past 20 years has been very rapid and it is estimated that in 1930 the population will be 60,000. The sanitary sewers and sewage treatment plant at Lakewood were installed in 1901. The outlet for the sewer system was located southwest of the city of Lakewood and within the village of Rocky River where a sewage treatment plant was installed with an effluent discharge into the river. At the time of the installation of the plant the population was not over 4,000, and the design provided for a capacity of 6,000. At the present time a population of 15,000 is tributary to the sewage treatment works. It will be seen that the works are seriously overburdened, and they cannot be expected to properly treat the sewage.

The plant comprises covered septic tanks and cinder contact filters. A bypass is located at the outlet of the septic tanks and there is reason to believe that the tank effluent is frequently allowed to enter the stream by this means. On June 27th appearances indicated that this had been the practice immediately prior to the investigation. In addition there are several sewers within the city of Lakewood which are not tributary to the plant and discharge into the river directly.

Pollution of Rocky River. The Rocky River above Lakewood has a watershed area of 280 square miles and an estimated minimum dry weather flow of 14 second feet. This flow is sufficient to receive the sewage from a population of about 3500 without a resultant nuisance. Observations made June 27th showed that appreciable quantities of sewage had been discharged into the stream as evidenced by sludge deposits and sewage growths noted near the outlet. At the time of the examination made July 17, 1913, the apparent pollution of the stream was greater. Of special importance regarding the pollution of Rocky River is the existence of the water works intake of the Rocky River at a point three-fourths mile below the sewage treatment plant at Lakewood. Although a water purification plant has been installed by the Rocky River Water, Light & Power Company, the excessive pollution of the raw water obtained from the river defeats the purpose of the plant. Numerous analyses have shown that the water supply of Rocky River is dangerously polluted even after filtration and is unfit for domestic use.

SUMMARY.

The foregoing report indicates that the city of Lakewood has permitted its sewage treatment plant to be seriously overworked as a result of which untreated sewage or an improperly treated sewage effluent is discharged into Rocky River. Following advice of the State Board of Health given February 26, 1913, that the city have prepared proper plans for improvement, no steps have been taken to improve conditions attending the disposal of sewage. Rocky River is polluted and the water supply of the village of Rocky River is seriously contaminated. Immediate steps should be taken to improve the insanitary conditions.

ACTION OF THE BOARD.

At a meeting held September 2, 1913, the State Board of Health considered this report of its special committee and found that the Rocky River at and below the outlet of the sewage treatment plant of the city of Lakewood was polluted by the discharge of untreated or improperly treated sewage, and that the water supply of the village of Rocky River, obtained from this stream, was thereby contaminated.

The Secretary was instructed to notify the authorities of Lakewood of the Board's findings, and to cite them to appear before the Board on the fifteenth day of October 1913, when the city of Lakewood would be given an opportunity to be heard in regard to the improvement and enlargement of the sewage treatment plant.

At its meeting held October 15, 1913, the State Board of Health adopted an order requiring the city of Lakewood to provide sewage treatment works, satisfactory to the Board before June 1, 1915, and the following order was sent to the Mayor and Council October 29, 1913.

OHIO STATE BOARD OF HEALTH.

Office of the Secretary.

AN ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF LAKEWOOD.

Whereas, The State Board of Health of the State of Ohio, having under consideration the conditions existing in the village of Rocky River, Cuyahoga County, Ohio, as set forth in a complaint in writing, made to said State Board of Health by the council of the village of Rocky River, did, in accordance with the duties imposed upon said Board, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

Whereas, The State Board of Health, after investigating the conditions complained of, found that the Rocky River at and below the outlet of the sewage treatment plant of the city of Lakewood, Cuyahoga County, Ohio, is polluted by the discharge of untreated or improperly treated sewage, and that the water supply of the village of Rocky River, obtained from that stream, is thereby contaminated, and

Whereas, Acting pursuant to the requirements of law, said State Board of Health on September 5, 1913, notified the mayor and council of said city of Lakewood, so causing the contamination or pollution of said stream, of its said findings and that the 15th day of October, 1913, at Cincinnati, Ohio, had been fixed as the time and place, when and where the said city of Lakewood would be given an opportunity to be heard before said Board, and

Whereas, On the 15th day of October, 1913, there was presented to the State Board of Health a communication from the solicitor of the city of Lakewood in which was stated that said solicitor, at a meeting of council on October 13, 1913, had been authorized by said council to waive right of hearing and to say that said council did not desire to introduce evidence or offer protest against the issuing of an order requiring the city to improve and enlarge the existing sewage treatment plant prior to January 1, 1915, or to install a new sewage treatment plant prior to June 1, 1915.

Thereupon, After discussion and due consideration of said complaint, the State Board of Health found and determined that improvements and changes in said conditions were necessary and should be made, and adopted the following order:

"Be it Ordered by the State Board of Health of the State of Ohio, that the city of Lakewood, Cuyahoga County, Ohio, provide sewage treatment works, satisfactory to the State Board of Health, before June 1, 1915, to correct the conditions as set forth in a resolution of the council of the village of Rocky River, passed January 2, 1913, and received by the State Board of Health January 6, 1913, and as found and determined by the State Board of Health from investigations made February 13 and June 27, 1913."

Thereupon, On motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by the said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

Eugene F. McCampbell, M. D.,
Secretary of the State Board of
Health of the State of Ohio.

October 27, 1913.

The foregoing report and findings have been examined by us respectively, the Governor of the State of Ohio and the Attorney General of the State of Ohio, and the same are in all respects approved this 28th day of October, 1913.

James M. Cox,
Governor of Ohio.
Timothy S. Hogan,
Attorney General of Ohio.

REPORT ON INVESTIGATION OF THE POLLUTION OF HONEY CREEK BY WASTES FROM THE WIRE, WELSH AND COMPANY DISTILLERY AT NEW MIDDLETOWN.

On June 3, 1913, the following petition of the board of county commissioners of Mahoning County was received:

"*To the State Board of Health.*

I, the undersigned, clerk of the County Commissioners of Mahoning County, State of Ohio, do hereby certify that the County Commissioners of said county, being in session on the 2nd day of June, 1913, adopted a resolution of which the following is a true copy.

Resolved, That Wire, Welsh & Co., located in Springfield Twp., Mahoning County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Honey Creek, and by reason thereof has so corrupted said Creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Springfield Twp., Mahoning County, Ohio, who reside in the vicinity of said Honey Creek.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said Wire, Welsh & Co. of Springfield Twp. to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) FRANK H. VOGAN,
Clerk Board of Co. Commissioners,
Mahoning County, Ohio.

Dated at Youngstown, Ohio, this 2nd day of June, 1913."

At a meeting of the State Board of Health held June 26, 1913, the matter was referred to the engineering department and on July 1, 1913, one of the assistant engineers made an investigation of the pollution of Honey Creek. The following report was submitted:

Honey Creek is a small tributary of the Little Beaver River, having its watershed almost entirely within Springfield Township, Mahoning County. It rises at a point about thirteen miles southeast of the city of Youngstown and flows in a southeasterly direction. The distillery of the Wire, Welsh & Company is located in the small hamlet of New Middletown, at the headwaters of Honey Creek. The plant is a small one, handling about 250 bushels of grain per day and producing about 215,000 gallons of wastes. Investigation revealed the fact that the discharge of wastes from the plant does not contribute to the pollution of Honey Creek. A local nuisance is created by the discharge of the wastes into a shallow excavation from which the liquid portion drains or evaporates, but no evidence was secured to show that Honey Creek is seriously polluted.

ACTION OF THE BOARD.

At a meeting held July 23, 1913, the State Board of Health considered this report, and the Board found that the wastes from the distillery of the Wire, Welsh & Company, at New Middletown do not pollute Honey Creek to an extent to give rise to foul and noxious odors and thereby create conditions detrimental to the health and comfort of the citizens of Springfield Township, Mahoning County, who reside in the vicinity of Honey Creek. The complainants were so notified July 24, 1913.

REPORT ON INVESTIGATION OF THE PUBLIC WATER SUPPLY OF PAINESVILLE.

On April 7, 1913, the State Board of Health received the following petition signed by 174 electors of the city of Painesville, attached to which was an affidavit of the clerk of the board of deputy state supervisors of elections of Lake County, attesting the signatures and the fact that the number represented more than 10 per cent of the electors of the city:

"PAINESVILLE, OHIO, March 19, 1913.

"*To the Ohio State Board of Health:*

"We, the undersigned bona fide electors of the city of Painesville, State of Ohio, believe the water supply of said city to be impure and dangerous to the health of the consumers of said supply.

"The State Board of Health is hereby respectfully requested to investigate said public water supply of said city of Painesville, Lake County, Ohio, and to require the removal of all sources of pollution affecting said supply; or, if this be impractical, to require said city of Painesville to secure a new source of water supply or to install and place in operation, water purification works to purify said existing supply, in accordance with 'An Act to authorize the state board of health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908."

In anticipation of the receipt of the petition the State Board of Health, at a meeting held March 20, 1913, appointed a committee comprising Dr. William T. Miller, member, and Mr. W. H. Dittoe, Chief Engineer, to investigate the water supply of the city. On April 13, 1913, the chairman of the committee visited Painesville and examined the existing water supply. Based on this examination and previous investigations by the Division of Engineering of the State Board of Health, the following report was prepared:

Painesville, a city with a population of 5,600, is located in Lake County on the Grand River, about three miles above its entrance into Lake Erie. Fairport, a village with a population of 2,300, is situated at the mouth of the Grand River, and Richmond, a village with a population of 300, is located about one mile above the mouth of the river. These two villages are furnished with the water supply of Painesville. Painesville is provided with a system of sewers constructed on the separate plan with outlets into the Grand River. Fairport and Richmond have a few short combined sewers discharging into the river. The principal pollution of the Grand River at Painesville is caused by the wastes from the plant of The Diamond Alkali Company, which was established in 1910.

INSTALLATION OF SUPPLY AND ACTIONS OF THE STATE BOARD OF HEALTH.

The first public water supply of Painesville was installed in 1882 by the Painesville Water Works Company; the supply being obtained from several large dug wells located on the bank of the Grand River at the foot of Liberty Street within the city. This supply proved insufficient and in 1895 the water of Severance Creek, a tributary of the Grand River, was made available as a source of supply. During 1887 this supply also failed and an intake was installed to draw water from the Grand River. In 1891 the original water works station and sources of supply then in use were abandoned and a new plant was installed on the shore of Lake Erie about one mile southwest of the Grand River. Ten dug wells placed in a line along the shore of the lake were installed to furnish the supply. These wells were constructed with brick walls five feet in diameter and about fifteen feet deep. They failed to furnish a sufficient quantity of water and in 1893 or 1894 were supplemented by infiltration galleries placed along the shore of the lake. The galleries delivered their yield into a reservoir about 9 feet wide, 400 feet long and 6 feet deep.

In March 1895, the State Board of Health considered a report upon the then existing water supply of Painesville and voted to disapprove of the supply. In 1897, following the legal difficulties between the city and the water works company, the city purchased the plant. About 1899, owing to the failure of the dug wells and galleries to furnish sufficient water, the city installed a direct intake to obtain water from Lake Erie at a point some 215 feet from the shore. This action was taken in violation of Section 1240 of the General Code without submitting plans to the State Board of Health for approval. In 1900 it was desired to abandon the use of lake water and to increase the supply by the installation of additional galleries. In August 1900, the State Board of Health disapproved of this proposed extension and advised the installation of a purification plant to treat water obtained from Lake Erie. This advice, however, was not followed by the city officials and the supply continued to be obtained from Lake Erie direct or from the infiltration galleries.

In 1910, the city made application for approval of an extension of the water works intake to a point 2,500 feet from the shore. After an investigation, the Board approved the extension only upon condition that a water purification plant be installed at the same time the extension was made. Subsequently, the city failed to make the proposed extension or to install a water purification plant.

PRESENT WATER SUPPLY.

As has been indicated in the foregoing resumé, the present water supply is obtained from two sources: namely, Lake Erie and infiltration galleries on the shore of the lake. The point at which the galleries and intake are located is about one mile southwest of the mouth of the Grand River and about twenty miles measured along the shore from the Collinwood sewer outlet of the city of Cleveland. The filter galleries at present in use consist of wooden boxes constructed of 2-inch lumber and having a cross section sixteen inches in width by ten inches in height. The tops and bottoms of the galleries are closed by the planks and the sides are covered by galvanized wire mesh screen. The trench in which they are placed is about six feet from the surface of the ground and is filled with gravel and sand. The total length of galleries which have been installed is about 2,700 feet, the last 1,000 feet of which was installed in 1900 and furnishes practically the entire yield. The flow from the galleries enters a collecting well twenty-five feet deep and twenty-five feet in diameter. The bottom is of concrete and the side walls are of brick.

The direct intake from the lake also leads to this collecting well. It is ten inches in diameter and extends to a point some 215 feet from the water's edge. Water obtained at this point is subject to pollution reaching it from the mouth of the Grand River or from the Collinwood sewer outlet of the city of Cleveland.

The water supply is generally used for domestic purposes in Painesville, Fairport and Richmond. The average daily consumption in the three municipalities is approximately 1.6 million gallons, of which about 600,000 gallons are used by the railroads. The pumping equipment is in a run-down condition and does not satisfactorily serve the needs of the city. It is, therefore, apparent that in connection with the improvement of quality of the supply rather extensive improvements in mechanical equipment will be necessary.

Quality of Water. Investigations, made by the State Board of Health at various times since 1895, have indicated that the water supply of Painesville is of unsatisfactory quality for domestic purposes. That portion obtained from Lake Erie is seldom free from turbidity and can never be relied upon as regards its sanitary quality. This renders the entire supply decidedly unsafe. The most recent examination of the water supply was made January 14, 1913, at which time water was being pumped through the lake intake. Samples were collected representing the raw lake water, the water from the collecting galleries and from two points on the distributing system. The result of the examinations indicated that all of these samples were of unsatisfactory quality from a sanitary standpoint. The bacterial content in all samples was excessive and intestinal organisms were found. The analytical results conform with the physical examination of the supply in indicating that it is polluted and unsafe for domestic purposes.

ACTION OF THE BOARD.

At a meeting of the State Board of Health, held April 17, 1913, after giving the authorities an opportunity to be heard, the Board adopted an order requiring the city of Painesville to install water purification works prior to January 1, 1914.

The following order was sent to the Mayor and Council April 30, 1913:

ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF PAINESVILLE.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the condition of the public water supply of the city of Painesville, Lake County, Ohio, as set forth in a complaint in writing, signed by more than ten percent of the electors of said city as certified by the clerk of the Board of Deputy State Supervisors of Elections in and for Lake County, Ohio, as required by Section 2 of an act of the General Assembly entitled, "An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution," passed April 7, 1908 (99 O. L. p. 74), did, in accordance with the duties imposed upon said Board by said act, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the public water supply of the city of Painesville is impure and dangerous to health and that it is not practicable sufficiently to improve the character of such supply by removing the source or sources of pollution affecting it, and that it is necessary for said city to install works for the purification of said public water supply in order to protect the health of the consumers of said water supply, and

WHEREAS, The council of the city of Painesville did, by resolution duly enacted, authorize the city solicitor of said city to waive issuance and service of notice of hearing in reference to the findings of the State Board of Health and to enter appearance for said city for all and every purpose, and

WHEREAS, Said city solicitor did voluntarily appear and waive issuance and service of notice of hearing, and

WHEREAS, The city of Painesville by its city solicitor did appear before the State Board of Health at a regular meeting held in the city of Columbus, April 17, 1913, and did admit that the public water supply of said city of Painesville is impure and dangerous to health and that it is not practicable sufficiently to improve the character of such supply by removing the source or sources of pollution affecting it, and did further admit that it is necessary to install and place in operation water purification works.

THEREUPON, The State Board of Health found from the report of its committee and from other evidence that the public water supply of the city of Painesville is impure and dangerous to health and did adopt the following:

ORDER.

Be it ordered by the State Board of Health of the State of Ohio, that the city of Painesville, Lake County, Ohio, shall install water purification works of a design satisfactory to the State Board of Health and have the same in operation before January 1, 1914; that the Secretary of the State Board of Health be instructed to transmit a copy of this order with the proceedings thereon to the

Governor and Attorney General for approval, and when such order is approved that he transmit a copy of the order and proceedings thereon to the mayor and council of the city of Painesville.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. McCampbell, M. D.,
Secretary of State Board of
Health of the State of Ohio.

April 29, 1913.

The foregoing findings and order of the State Board of Health having been examined by us respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, the same are in all respects approved this 30th day of April, 1913.

James M. Cox,
Governor of Ohio.
Timothy S. Hogan,
Attorney General of Ohio.

STATEMENT RELATIVE TO POLLUTION OF THE GRAND RIVER AND LAKE ERIE BY WASTES FROM THE DIAMOND ALKALI COMPANY, PAINESVILLE.

On April 16, 1913, a resolution of the city council of Painesville adopted April 14, 1913, was received from Mr. Frank L. Kelley, clerk. Section one of the resolution is as follows:

> "Section 1. That in accordance with Section 1249 of the General Code of Ohio it is hereby declared to be a fact that The Diamond Alkali Company, a corporation, is permitting to be discharged into Grand River and Lake Erie wastes of so deleterious character as to create a public nuisance, detrimental to health and comfort, and is polluting the source of public water supply of the city of Painesville."

Subsequent to the receipt of the resolution a representative of the engineering department examined the alleged pollution of the Grand River and Lake Erie on April 29, 1913. At this time no detailed examination was made and there was no attempt to obtain analytical evidence of the alleged pollution.

On May 27, 1912, a previous complaint asking investigation of the pollution of the Grand River by the wastes from The Diamond Alkali Company was made by the clerk of the trustees of Painesville Township. Subsequently, on June 24, 1913, an investigation of the alleged nuisance was made by a representative of the engineering department. After this investigation and report thereon the complainant and officials of The Diamond Alkali Company were advised that a very decided pollution of the Grand River was being caused and that a thorough study should be made to devise a method of treatment of the wastes to avoid the nuisance. The complainant was informed that the State Board of Health could take no action upon his complaint to bring about an abatement of the nuisance.

The resolution of council alleged that the wastes of the plant of The Diamond Alkali Company create a nuisance detrimental to health and comfort and also the fact that the source of public water supply of the city of Painesville is polluted. There is no doubt of the existence of a nuisance in the Grand River. However, the nuisance is not detrimental to public health and is rather an interference with the use of the stream as a water supply for commercial purposes. Injury caused by the pollution of the stream should, therefore, be a matter for court action. As regards the possibility of the pollution of the Painesville water supply the State Board of Health made an extended examination of the quality of Lake Erie near the mouth of the Grand River in May 1910, and found that the quality of the water at the intake was influenced by the discharge of the Grand River. At the present the city is engaged in preliminary steps to install a new water supply with an extended intake and a purification plant. It would, therefore, appear ill-advised at this time to carry on an investigation of such scope as would be required to determine the pollution of the water supply of Painesville. It would be preferable to await the submission of plans for the intake extension and to determine at that time the suitability of the water obtained at the proposed intake location.

ACTION OF THE BOARD.

At a meeting held May 22, 1913, the State Board of Health considered the foregoing resolution.

The Secretary was instructed to notify the authorities that the Board voted to defer action under Sections 1250 and 1251 of the General Code, and that they be advised as follows:

1st. That investigations of the State Board of Health made June 24, 1912, and April 29, 1913, indicated that a serious nuisance was created in the Grand River by the discharge of wastes from The Diamond Alkali Company's plant.

2nd. That this nuisance is of such character as to be deleterious to the quality of the river water for use as a commercial water supply, but it is not shown to be detrimental to public health.

3rd. That previous examinations by the State Board of Health made in May, 1910, indicated that pollution of the water supply by water from the Grand River was possible.

4th. That inasmuch as the city is now taking steps to improve its water supply, a thorough investigation to determine the pollution of the supply by the discharge of the Grand River will be deferred until a later date.

SUPPLEMENTAL ORDER OF THE STATE BOARD OF HEALTH TO THE VILLAGE OF PLYMOUTH.

WHEREAS, The State Board of Health did, on the 28th day of October, 1912, transmit to the Governor and the Attorney General for approval an order directing the village of Plymouth, Richland County, Ohio, to purify the present water supply or secure a new water supply, satisfactory to the State Board of Health, within a period of six months from the date of the approval of the Board's order by the Governor and the Attorney General, and

WHEREAS, On the 13th day of November, 1912, the Governor and the Attorney General signed such order of the State Board of Health and a copy of said order so signed was sent to the mayor and council of the village of Plymouth, and

WHEREAS, At a meeting of the State Board of Health, held on the 15th day of May, 1913, representatives of the village, duly authorized, appeared before the Board and requested an extension of time within which to carry out said order.

THEREUPON, The State Board of Health, by due action, granted an extension of time of six months from the 13th day of May, 1913, and ordered its Secretary to transmit notice of such action to the Governor and the Attorney General, and to request their approval of such action.

I hereby certify that said proceedings above set forth were duly had before said Board, as shown by the minutes thereof. June 1, 1913.

E. F. McCAMPBELL,
Secretary of State Board of
Health of the State of Ohio.

The foregoing action of the State Board of Health has been reviewed by us, respectively, the Governor of the State of Ohio, and the Attorney General of the State of Ohio, and the same is in all respects approved this 7th day of June, 1913.

JAMES M. COX,
Governor of Ohio.
TIMOTHY S. HOGAN,
Attorney General of Ohio.

REPORT ON POLLUTION OF SWAN CREEK AND TEN MILE CREEK BY SEWAGE FROM TOLEDO.

On September 13, 1910, there was received from the clerk of the council of Toledo, a certified copy of the following resolution, setting forth the polluted condition of Swan Creek and requesting investigation and abatement of the nuisance by the State Board of Health.

"Be it Resolved by the Council of the City of Toledo, State of Ohio:

"SECTION 1. That the condition of Swan Creek is such as to be a menace to the health of the people of the City of Toledo living in that vicinity and is hereby declared to be a nuisance, and the State Board of Health is requested to send a representative to look into the condition of said Swan Creek in person and to abate said nuisance.

"SECTION 2. That the City Clerk be and he hereby is directed to send a copy of this resolution to the State Board of Health.

Approved Sept. 10, 1910.

AMBROSE A. MOODY, *Acting Mayor.*
J. C. STAUNTON, *Pres. Pro Tem. of Council.*"

Adopted Sept. 6, 1910.
Attest: JOHN M. BABCOCK, *Clerk of Council.*

On October 24, 1910, a petition signed by some 1,500 residents of Toledo was received from Dr. J. A. Duncan, a citizen, complaining of the pollution of Swan Creek.

On December 31, 1910, the following petition requesting investigation of the pollution of Ten Mile Creek by the city of Toledo was received from the clerk of Washington Township, Lucas County.

"*To The Ohio State Board of Health:*

I, the undersigned, clerk of Washington Township, Lucas County, State of Ohio, do hereby certify that the trustees of said township, being in session on the 24th day of December, 1910, adopted a resolution of which the following is a true copy:

Resolved, That the City of Toledo, located in Lucas County, Ohio, is discharging and permitting to be discharged, sewage and other wastes into Ten Mile Creek, and by reason thereof has so corrupted said Ten Mile Creek as to give rise to foul and noxious odors, thereby creating conditions that are detrimental to the health and comfort of the citizens of Washington Township, Lucas County, Ohio, who reside in the vicinity of said creek.

The State Board of Health is hereby respectfully requested to investigate the conditions complained of, and to require the said City of Toledo, to install such works or means for purifying or otherwise disposing of its sewage and other wastes as may be determined by said board, in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7th, 1908.

(Signed) REUBEN MURRAY,
Clerk Washington Township, Lucas County, Ohio."

Dated at West Toledo, Ohio, this 29th day of Dec., 1910.

Subsequenty, owing to the fact that the Bense Act was in litigation, action by the State Board of Health under Sections 1249 to 1261 of the General Code was delayed by the State Board of Health. At a meeting of the Board held January 22, 1913, a committee, consisting of Dr. Oscar Hasencamp, president, and the Chief Engineer, was appointed to investigate and report upon the pollution of Swan Creek and Ten Mile Creek. On February 11, 1913, the committee visited Toledo, conferred with the city officials and investigated the condition of the streams. The following report was made:

Toledo is located in Lucas County at the mouth of the Maumee River and has a present population of approximately 180,000. Swan Creek flows in an easterly direction through the southerly portion of the city, discharging into the Maumee River, a short distance south of the business district. Ten Mile Creek flows in a northeasterly direction and forms the northerly corporation line of the city. It discharges into the Maumee Bay about five miles north of the city. The topography of the city is flat, the natural surface drainage reaching Swan Creek, Ten Mile Creek, or the Maumee River.

The city is provided with a public water supply derived from the Maumee River at a point above the city, and purified by a rapid sand filter plant. The sewerage of the city is constructed almost entirely on the combined plan and the flow is discharged through numerous outlets into Swan Creek, Ten Mile Creek, and the Maumee River. The conditions in the two creeks have been objectionable for a number of years and have been constantly complained of by persons residing in their vicinity.

SWAN CREEK.

Swan Creek has a watershed area of about 190 square miles. Above Toledo it passes through farm territory and receives the drainage from two small communities. According to a report submitted November 1911, to the city of Toledo by Mr. W. J. Sherman, consulting engineer, the mean annual flow of the stream is 117 cubic feet per second. The mean summer flow from May to November is seventy-one cubic feet per second, and the minimum measured flow is seven cubic feet per second. For a considerable distance above the mouth of the stream the flow is influenced by the level of Lake Erie. Back water extends about one mile upstream from the mouth and by dredging, the stream is maintained navigable at its lower end. Along its course through the city the stream passes through a rather completely built up section largely devoted to manufacturing and other commercial interests. However, a residential district of considerable extent is located near the stream.

Sewage Discharged into the Stream. Swan Creek receives sewage at a number of points along its course from Detroit Avenue near the westerly corporation line of the city to its mouth. Eighteen sewer outlets varying in size from twelve inches to sixty inches in diameter discharge sewage into the stream. The total volume of sewage discharged during dry weather is estimated by Mr. Sherman to be 7.5 cubic feet per second, or 4.86 million gallons per twenty-four hours. In addition, approximately 1.3 cubic feet per second of manufacturing wastes are discharged into the creek through private sewer outlets. In comparison to the minimum flow of the stream (seven cubic feet per second) the normal sewage flow exceeds that of the stream. It is, therefore, not surprising that during periods of low flow an extreme nuisance is created in Swan Creek. Under ordinary conditions a dilution of at least twenty-five to one is required to avoid putrefaction and provide satisfactory disposal of the sewage by dilution. With a dilution one to one the stream becomes practically an open sewer.

In September 1910, a committee of the State Board of Health investigated the condition of Swan Creek from its mouth to City Park Avenue. At this time it was found that the stream was in effect an elongated septic tank and a serious nuisance was caused. An examination by a committee of the Board February 11, 1913, was made at the time when the stream was frozen and it was, therefore, impossible to make visual observations.

TEN MILE CREEK.

Ten Mile Creek has a watershed area of about 130 square miles, and its mean annual flow, as stated by Mr. Sherman, is about eighty cubic feet per second, and the minimum measured flow, 2.5 cubic feet per second. The flow of the stream is influenced to a point about six miles above its mouth by the level of Lake Erie and during certain seasons of the year this influence has a marked effect upon the pollution of the stream. Along its course across the northerly portion of the city the stream passes through Ottawa Park, Central Grove Park, and borders a boulevard constructed by the city.

Sewage Discharged into the Stream. Between Monroe Street in the northwesterly portion of the city and LaGrange Street in the northerly portion of the city sewage is discharged into Ten Mile Creek through six sewer outlets established at various times. Below Monroe Street, especially during dry weather, the stream is seriously polluted and the extent of the pollution becomes greater toward the mouth of the creek. The total volume of sewage discharged into Ten Mile Creek from the city is estimated by Mr. Sherman at ten cubic feet per second, or 6.48 million gallons per twenty-four hours. In addition approximately 1.5 cubic feet per second of manufacturing wastes are discharged through private sewer outlets. The minimum flow of Ten Mile (2.5 cubic feet per second) will be seen to be totally inadequate to dilute the sewage. The creek in dry weather is, therefore, an open sewer and almost the entire visible flow is sewage. At such times extremely objectionable conditions are created and these are seriously complained of by the inhabitants of the city who are affected.

The examination of the pollution of Ten Mile Creek made by an assistant engineer in July, 1910, showed that the stream was grossly polluted. The examination made February 1913, was at the time when the flow of the stream was considerably above normal, and therefore no extreme pollution was noted.

MAUMEE RIVER.

Although not included in the complaints submitted, some attention should be given to the discharge of sewage into the Maumee River. This stream has a watershed area above Toledo of approximately 6.345 square miles and has a minimum dry weather flow estimated at 200 second feet. The water front is extensively used for dockage. Sewage is discharged into the Maumee River through eighteen sewer outlets, varying in size from twenty-four to 102 inches in diameter. The total volume of sewage discharged during dry weather is estimated at twenty cubic feet per second. The dry weather flow of the river affords a dilution of ten to one, which is insufficient to prevent putrefaction. The effect of sewage discharge upon the water supply of the city is important. The fluctuation in level of Lake Erie at times drives the water in the channel of the river in an up-stream direction and thereby causes the water supply to be endangered. It is important that sewage be discharged as far down stream as is possible to avoid this occurrence.

SUMMARY.

Swan Creek is seriously polluted by sewage and industrial wastes discharged into the stream within the city of Toledo, and conditions are thereby created which are detrimental to the health and comfort of persons residing or passing in the vicinity of the stream.

Ten Mile Creek is seriously polluted by sewage and industrial wastes discharged into the stream within the city of Toledo, and conditions are thereby created which are detrimental to the health and comfort of persons residing or passing in the vicinity of the stream.

ACTION OF THE BOARD.

After giving the authorities of Toledo a hearing the Board adopted the report of its committee, and the following orders were sent to the mayor and council and the director of public service August 30, 1913:

AN ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF TOLEDO.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the pollution of Swan Creek within the city of Toledo, Lucas County, Ohio, as set forth in a complaint, in writing, made to the State Board of Health by the council of the city of Toledo, as required by Section 1249 of the General Code of Ohio, and in a petition signed by some fifteen hundred residents of said city, did, in accordance with the duties imposed upon said Board, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint and petition, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the said city of Toledo, Lucas County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Swan Creek, and that conditions are thereby created that are detrimental to the health and comfort of persons residing near or passing in the vicinity of said stream, and

WHEREAS, Acting pursuant to the requirements of law, said State Board of Health on the 26th day of February, 1913, notified the mayor and council and the director of public service of said city of Toledo, so causing the contamination or pollution of such creek, of its said findings and that the 20th day of March, 1913, had been fixed as the time when the said city would be given an opportunity to be heard before said Board, and

WHEREAS, On the 20th day of March, 1913, pursuant to said notice, there appeared before the State Board of Health members of council and other officers of the city of Toledo, and the matters as contained in said complaints were discussed by said officials and by the State Board of Health, and the fact that said creek is seriously polluted was admitted by said representatives of the city of Toledo, and a sufficient time was asked within which said city could make the necessary studies and submit plans for the abatement of the nuisance; and

WHEREAS, The State Board of Health at a regular meeting, held July 23, 1913, gave further consideration to and discussed the necessity for the improvement of Swan Creek;

THEREUPON, The State Board of Health found and determined that the improvement and changes are necessary to correct conditions now existing in Swan Creek and did adopt the following order:

BE IT ORDERED by the State Board of Health of the State of Ohio that the city of Toledo install and have in operation within two years from the date of the approval of this order by the Governor and the Attorney General, the necessary intercepting sewer and sewage treatment works to correct the conditions in Swan Creek, as set forth in the petition received by the State Board of Health from the council of the city of Toledo, September 13, 1910, and as found and determined by said Board from the investigation made February 11, 1913, and other evidence presented at a meeting of the Board held March 20, 1913.

THEREUPON, on motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by the State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. MCCAMPBELL, M. D.,
Secretary of State Board of Health of the State of Ohio.

August 4, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio and the Attorney General of Ohio, and the same are in all respects approved this 25th day of August, 1913.

JAMES M. COX,
Governor of Ohio.
TIMOTHY S. HOGAN,
Attorney General of Ohio.

AN ORDER OF THE STATE BOARD OF HEALTH TO THE CITY OF TOLEDO.

WHEREAS, The State Board of Health of the State of Ohio, having under consideration the pollution of Ten Mile Creek within the city of Toledo, Lucas County, Ohio, as set forth in a complaint, in writing, made to the State Board of Health by the trustees of Washington Township, Lucas County, Ohio, as required by Section 1249 of the General Code of Ohio, did, in accordance with the duties imposed upon said Board, pursue all and singular the duties to be performed by said State Board of Health, and having inquired into and investigated the conditions complained of in said complaint, and

WHEREAS, The State Board of Health, after investigating the conditions complained of, found that the said city of Toledo, Lucas County, Ohio, is discharging and permitting to be discharged sewage and other wastes into Ten Mile Creek, and that conditions are thereby created that are detrimental to the health and comfort of persons residing or passing in the vicinity of said stream; and

Whereas, Acting pursuant to the requirements of law, said State Board of Health on the 26th day of February, 1913, notified the mayor and council and the director of public service of said city of Toledo, so causing the contamination or pollution of said creek, of its findings and that the 20th day of March, 1913, had been fixed as the time when the said city would be given an opportunity to be heard before said Board; and

Whereas, On the 20th day of March, 1913, pursuant to said notice, there appeared before the State Board of Health members of council and other officials of the city of Toledo, and the matters as contained in said complaint were discussed by said officials and by the State Board of Health, and the fact that said creek is seriously polluted was admitted by said representatives of the city of Toledo, and a sufficient time was asked within which said city could make the necessary studies and submit plans for the abatement of the nuisance; and

Whereas, The State Board of Health at a regular meeting, held July 23, 1913, gave further consideraiton to and discussed the necessity for improvement of Ten Mile Creek;

Thereupon, The State Board of Health found and determined that the improvement and changes are necessary to correct conditions now existing in Ten Mile Creek and did adopt the following order:

Be it Ordered by the State Board of Health of the State of Ohio that the city of Toledo install and have in operation within two years from the date of the approval of this order by the Governor and the Attorney General, the necessary intercepting sewer and sewage treatment works to correct the conditions in Ten Mile Creek, as set forth in the petition received by the State Board of Health from the trustees of Washington Township, Lucas County, Ohio, December 31, 1910, and as found and determined by the said Board from the investigation made February 11, 1913, and other evidence presented at a meeting of the Board held March 20, 1913.

I hereby certify that the foregoing report and findings were duly made by the State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. McCampbell, M. D.,
Secretary of State Board of Health
of the State of Ohio.

August 4, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio and the Attorney General of Ohio, and the same are in all respects approved this 25th day of August, 1913.

James M. Cox,
Governor of Ohio.
Timothy S. Hogan,
Attorney General of Ohio.

REPORT ON PROPOSED WATER PURIFICATION PLANT FOR WOODSFIELD.

On January 18, 1913, plans and specifications for a proposed water purification plant for Woodsfield were received from The W. J. Sherman Company, consulting engineers for The Woodsfield Water Company, the owners of the water supply of the village. On July 30, 1912, a complete examination of the supply was made by a representative of the engineering department. After the examination of the plans of the consulting engineers, the following report was submitted:

Woodsfield is a village with a population of 2,500, located in Monroe County on the watershed of Sunfish Creek, a tributary of the Ohio River. The surrounding country is quite hilly, the maximum variations in elevation being somewhat over 300 feet.

The water supply was installed in 1901 by The Woodsfield Water Company, being obtained from a reservoir impounding the flow of Whittenbrook Run, a small tributary of Sunfish Creek.

At a meeting held October 23, 1912, the State Board of Health voted to require The Woodsfield Water Company to submit plans for the purification of the supply prior to the January 1913 meeting. Acting upon this requirement the water company retained the services of consulting engineers, who have prepared plans for the improvement of the supply.

PRESENT WATER SUPPLY.

The water supply is derived from a reservoir impounding the flow of Whittenbrook Run, storing some 40,000,000 to 50,000,000 gallons of water. The area of the reservoir is about 10 acres and the maximum depth is about 30 feet. The intake connecting with a gravity supply line leading to the pumping station is located in the deepest portion of the reservoir, and consists of a 10-inch cast iron pipe. The watershed of the stream above the reservoir is about 1 square mile in area and contains about six dwellings. The topography is hilly and the run-off quite rapid. The water is, therefore, at times very turbid.

At the present time the supply is pumped to a distributing reservoir, which has a capacity of 450,000 gallons. By filling this reservoir pumping is required only two or three times each week. The water supply is used by only 1,000 persons, owing in part to its inferior quality. The previous analyses of the Board have shown that the supply is unfit for domestic use without treatment, and occasional complaints have been made on account of tastes and odors contained in the water.

PROPOSED WATER PURIFICATION PLANT.

The plans of the consulting engineers provide for the installation of a water purification plant of the rapid sand type with a net capacity of 600,000 gallons per 24 hours. The plans comprise a coagulating basin, devices for applying the coagulant, a filter, and a clear well. The plant will be installed at the present pumping station. The present pumping capacity is 600,000 gallons per day, which figure determined the capacity of the proposed plant.

Coagulating Basin. The raw water will be discharged into a mixing chamber at one corner of the coagulating basin, at which point the coagulant will be applied. The effect of this mixing chamber could be improved by discharging the raw water at or near the surface instead of at the bottom as shown on the plans. The coagulating basin proper has a capacity of 52,000 gallons which provides two hours retention when the plant is operated at a rate of 600,000 gallons per day. In view of the preliminary subsidence accomplished by the impounding reservoir the coagulating period will probably prove sufficient. The basin will be constructed of concrete and will be provided with a baffle to accomplish satisfactory displacement. The bottom is sloped to a sludge drain at one corner of the basin.

Coagulant Devices. Two solution tanks, each with a capacity of 260 gallons are provided for coagulants, one for alum and the other for lime. The coagulants will be applied through properly constructed orifice tanks, the discharge piping leading to the mixing chamber in the coagulant basin. A branch line should also be installed to provide for application at the filter influent. In order to maintain the solutions at constant strength air agitation is provided, the air being furnished by a blower.

The filter will be of the rapid sand type, 13 feet 9 inches by 16 feet in plan with an area of 0.005 acre, giving a net capacity of 600,000 gallons with a rate of operation of 125,000,000 gallons per acre per day. The filter tank is a rectangular, reinforced concrete box, and the filtering material will comprise 27 inches of sand and 9 inches of graded gravel. The strainer system will be of a recognized standard type with four strainers per square foot of filtering surface. The filters will be washed by a reversed current of water assisted by air agitation. Wash water will be taken from the pressure main and unless precaution is taken improper application of wash water may result. A pressure regulating valve should be inserted in the wash line.

The plans show no loss of head gages or rate controllers for the filter. While the former devices may be omitted without serious results, the latter devices should be installed to prevent excessive and fluctuating rates of filtration.

Clear Well. The clear well, receiving the filter effluent, is located outside the pumping station building, and is at present utilized as a pump well. It has a capacity of 10,000 gallons furnishing 25 minutes storage when pumping is at the rate of 600,000 gallons per day. While this storage is small, it should be noted that the distributing reservoir provides an additional storage of 450,000 gallons which is sufficient for any emergency.

ACTION OF THE BOARD.

At a meeting held January 22, 1913, the plans for a proposed water purification plant for Woodsfield submitted by the W. J. Sherman Company, of Toledo, January 18, 1913, were approved subject to the following conditions:

1st. That samples of all filtering material be submitted to the engineer of the State Board of Health before the material is placed;

2nd. That a rate controller of a type satisfactory to the engineer of the State Board of Health be installed;

3rd. That an auxiliary coagulant feed line be installed to provide for application of the coagulant at the outlet end of the coagulating basin;

4th. That this approval shall be void unless the proposed plant shall have been installed prior to January 1, 1914.

REPORT ON A WATER PURIFICATION PLANT FOR THE VILLAGE OF WOODSFIELD.

May 1, 1913, the following petition was received from the health officer of Woodsfield serving in lieu of a board of health:

"*To the Ohio State Board of Health:*

"I, the undersigned health officer in lieu of a board of health of Woodsfield, Monroe County, State of Ohio, do hereby certify that as such health officer on the 26th day of April, 1913, adopted a resolution of which the following is a true copy:

Resolved, That the public water supply of the Woodsfield Water Company, located in Monroe County, Ohio, is believed to be impure and dangerous to the health of the consumers of said supply.

The State Board of Health is hereby respectfully requested to investigate said public water supply of said Water Company of Woodsfield, Monroe County, Ohio, and to require the removal of all sources of pollution affecting said supply; or, if this be impractical to require said Water Company of Woodsfield, Ohio, to secure a new source of water supply, or to install and place in operation water purification works to purify said existing supply in accordance with 'An Act to authorize the State Board of Health to require the purification of sewage and public water supplies and to protect streams against pollution,' passed April 7, 1908.

(Signed) LOUIS HOEFFLER,
Health Officer.

Dated at Woodsfield, Ohio, the 29th day of April, 1913."

At a meeting of the State Board of Health held May 15, 1913, this complaint was considered, and the Board having the reports of its Engineering Department on the investigation of the public water supply of Woodsfield, and the resolution adopted at its March 20, 1913 meeting, found that the public water supply of Woodsfield was unsuitable for use.

The Woodsfield Water Company was given an opportunity to be heard at a meeting held June 26, 1913, but failed to appear and the Board then adopted the following order:

OHIO STATE BOARD OF HEALTH.

Office of the Secretary.

AN ORDER OF THE STATE BOARD OF HEALTH TO THE WOODSFIELD WATER COMPANY.

Whereas, The State Board of Health of the State of Ohio, having under consideration the condition of the public water supply of the village of Woodsfield, Monroe County, Ohio, as set forth in a complaint, in writing, made to the State Board of Health by the health officer, duly appointed to serve in place of a board of health for said village, and as required by Section 1252 of the General Code, did, in accordance with the duties imposed upon said Board with reference to such complaints, pursue all and singular the requirements and duties to be performed by said State Board of Health, and having previously inquired into and investigated the conditions complained of in said complaint, and

Whereas, The State Board of Health, after investigation of said water supply found that the supply was unsuitable for use, and

Whereas, Acting pursuant to the requirements of Section 1253 of the General Code, said State Board of Health thereupon on the 17th day of May 1913, notified the Woodsfield Water Company of its said findings and gave said company, through its officials, an opportunity to be heard before said Board on the 26th day of June 1913, and

Whereas, On the 26th day of June 1913, the officials of the Woodsfield Water Company having failed to appear before the Board and having filed no valid evidence, protest or remonstrate against the action or findings heretofore made,

Thereupon, The State Board of Health found and determined that improvements and changes in the public water supply of the village of Woodsfield as supplied by the Woodsfield Water Company, are necessary and should be made and did adopt the following order:

Be it ordered by the State Board of Health of the State of Ohio, that the Woodsfield Water Company shall install a water purification plant, of a design satisfactory to the State Board of Health, prior to January 1, 1914.

Thereupon, On motion duly seconded, the report and findings of the State Board of Health were ordered transmitted to the Governor and the Attorney General for their action thereon.

I hereby certify that the foregoing report and findings were duly made by said State Board of Health of the State of Ohio, and that the proceedings above set forth were duly had before said Board, as shown by the minutes thereof.

E. F. McCampbell, M. D.,
Secretary of State Board of Health of the State of Ohio.

July 7, 1913.

The foregoing report and findings have been examined by us, respectively, the Governor of the State of Ohio, and the Attorney General of Ohio, and the same are in all respects approved this 22nd day of July, 1913.

James M. Cox,
Governor of Ohio.
Timothy S. Hogan,
Attorney General of Ohio.

MISCELLANEOUS REPORTS

REPORT ON INVESTIGATION OF THE SANITARY CONDITIONS OF THE HYDRAULIC AND TRANSPORTATION CANALS AT DAYTON.

On May 19, 1913, the following resolution of the Board of Health of Dayton, adopted May 15, 1913, was received from Dr. D. B. Conklin, president of the board:

"*Be it resolved by the Board of Health of the City of Dayton, State of Ohio*: That

"WHEREAS, The Board of Health of the City of Dayton, State of Ohio, has completed an examination and inspection of the canals and waterways owned by the State of Ohio, those owned by the Dayton Hydraulic Co., of Dayton, Ohio, and those controlled by the Cooper Hydraulic Co., of Dayton, Ohio, under lease from the State of Ohio, and has found such canals and waterways to be in an unsanitary condition, being filled in many places with foul smelling stagnant water and with rubbish and filth, all of which is not conducive to the good health of the community, and

"WHEREAS, These canals and waterways have been practically abandoned, and now are only used to serve the purpose of furnishing power to a few manufacturing plants, now therefore

"*Be it resolved by the Board of Health of the City of Dayton, State of Ohio:*

"That the canals and waterways owned by the State of Ohio, and located in the City of Dayton, Ohio, — those owned by the Dayton Hydraulic Co., and located in said city, and that portion of the canal system of the State of Ohio, located in said city and controlled under lease from the State of Ohio by the Cooper Hydraulic Company, be and they are hereby declared to be public nuisances and a menace to the public health of said city.

"*Further resolved*, That the Ohio State Board of Health be requested to make a complete investigation of the above described waterways, in the manner provided by law, and that said Board be further requested to take such action as may be necessary and proper in order that an immediate abatement of said nuisances may be effected."

At a meeting of the State Board of Health held May 22, 1913, Dr. R. H. Grube, member, and Mr. W. H. Dittoe, chief engineer, were appointed as a committee to investigate the conditions complained of.

On June 17, 1913, the committee visited Dayton and in company with representatives of the local board of health made an examination of the conditions of the waterways referred to. The following report was submitted:

The Miami and Erie Canal constructed 1825-1828 by the State of Ohio flows in a southerly direction through the city of Dayton in the valley of the Great Miami River. It crosses the Mad River about 1.25 miles above its confluence with the Miami River. Some 2,000 feet above the aqueduct a canal feeder leads from the Mad River joining the canal a short distance south of the aqueduct. The course of the canal is south of and parallel to the Mad River to a point near the central portion of the city, and thence it flows in a southerly direction paralleling the Great Miami River. The canal has not been used for transportation purposes for a great many years and the embankments and locks are in a very poor state of repair.

The hydraulic canals complained of are known locally as the Dayton Hydraulic Canal and the Cooper Hydraulic Canal. The former waterway, constructed in 1845, is owned and operated by the Dayton Hydraulic Company, and the latter, built in 1838, is owned by the State of Ohio, and operated under lease by the Cooper Hydraulic Company. The Dayton Hydraulic Canal is fed from the Mad River at a point three miles east of the confluence of the Mad River with the Great Miami River which is about one-half mile east of the easterly corporation line of the city. At this point a low rubble masonry dam has been built in the Mad River and an intake channel provided with sluice gates has been installed. The Dayton Hydraulic Canal parallels the Mad River following a course about 2,500 feet south of the river to a point one mile east of the central portion of the city. The total length of the Dayton Hydraulic Canal is three miles. The water wasted from the hydraulic at its lower end as well as that used for power purposes enters the Cooper Hydraulic Canal which is at a lower elevation, approximately the same as that of the Miami and Erie Canal.

The Cooper Hydraulic Canal branches from the Miami and Erie Canal at a point 2,000 feet below the aqueduct. It follows a general southwesterly direction its overflow entering the canal southeast of the central portion of the city. The Cooper Hydraulic Canal has a total length of 1.25 miles.

From the above brief description, it will be seen that the water reaching the Dayton Hydraulic Canal from the Mad River is wasted to the Cooper Hydraulic Canal, which in turn is wasted to the Miami and Erie Canal. When the canal feeder is being used the Cooper Hydraulic Canal obtains a portion of its supply from the canal.

Sanitary Conditions of Waterways. The Dayton Hydraulic Canal receives a varying quantity of water from the Mad River which water is normally of good appearance. The hydraulic receives a considerable degree of pollution from a packing plant of The William Fockes Sons Company, located just within the easterly corporation line of the city one-half mile below the head of the hydraulic. All of the wastes from this packing house are discharged into the stream which practice results in a greater or less pollution. Within the built up portion of the city the hydraulic is used as a dumping ground for refuse of all kinds. Small heaps of garbage were noticed at frequent intervals along the banks. The city has installed seven storm water sewer outlets varying in size from 12 to 54 inches in diameter which discharge into the Dayton Hydraulic Canal at various points along its course.

The Dayton Hydraulic Canal is used as a source of water power supply by two concerns, the Mercantile Corporation and The Aughe

Plough Works, located at its lower end. The tail races discharge into the Cooper Hydraulic Canal situated at the lower level a short distance to the north.

On the day of the investigation the direction of flow in the Cooper Hydraulic Canal was principally upstream to the northeast from the lower end of the Dayton Hydraulic Canal to the Miami and Erie Canal. A small portion of the flow was in a southwesterly direction toward the lower end of the Cooper Hydraulic Canal. The wastes from a brewery located a short distance northeast of the discharge of the tail races enter the Cooper Hydraulic Canal and cause an excessive pollution of this waterway. From this point to its confluence with the Miami and Erie Canal it is not known that any additional pollution is contributed, although a storm sewer 42 inches in diameter discharges into the hydraulic at First Street. Southwest of the discharge of the tail races the Cooper Hydraulic Canal, on the day of the investigation, had a slight flow and the water was almost stagnant. This condition was, however, not distinctly insanitary. The Cooper Hydraulic Canal is not at present used as a source of water power.

As has been stated the flow from the Cooper Hydraulic Canal was entering the Miami and Erie Canal, the direction being the reverse of the usual direction of flow due to the fact that locks in the canal were open. The entire flow in the Miami and Erie Canal was derived from the Cooper Hydraulic Canal, and that portion of it northeast of the confluence of these waterways was motionless and stagnant. The Miami and Erie Canal was found to be in an insanitary condition. The fact that the locks were open exposed the tanks and a large portion of the bottom of the canal and revealed the presence of foul slimy sludge deposits. This may have resulted from the recent flood but appeared to have been the result of several years' accumulation. The canal in its course through the city is quite generally used as a dumping ground and as a receptacle for wastes of a miscellaneous character. One instance was noted in which a creamery discharged its wastes into the canal and numerous cases were observed in which drainage from manure heaps and privies could easily enter the canal. In its course through the city the canal receives the discharge from twenty-seven storm water sewer outlets varying in diameter from 12 inches to 108 inches. In the southerly portion of the city below the discharge of the Cooper Hydraulic Canal the water flowing into the canal was visibly polluted and produced a foul odor.

SUMMARY.

From the foregoing report it will be seen that the hydraulic and transportation canals within the city of Dayton have not been maintained in a sanitary condition. These waterways are used to a slight extent for power purposes at the present time and it will probably be found impossible to so maintain them as to prevent their misuse as receptacles for sewage and other wastes. In their present condition they are detrimental to the promotion of the sanitation of the city.

RECOMMENDATIONS.

It is recommended that the State Board of Health adopt the following finding from the foregoing report:

That the canals and waterways located within the city of Dayton, owned by the State of Ohio and the Dayton Hydraulic Company, and known as the Miami and Erie Canal, the Dayton Hydraulic Canal, and the Cooper Hydraulic Canal, are in an insanitary condition due to improper maintenance and misuse as receptacles for wastes; and that the condition should be improved (a) by removing the contributing causes of the pollution and by providing for proper control and maintenance, or (b) by adandoning and filling the waterways.

ACTION OF THE BOARD.

At the June meeting of the State Board of Health this report was adopted and the Secretary was instructed to send a copy of the report to the Superintendent of Public Works, the Dayton Hydraulic Company, the Cooper Hydraulic Company of Dayton and the Board of Health of that city.

REPORT

OF

DIVISION OF COMMUNICABLE DISEASES

REPORT OF THE DIVISION OF COMMUNICABLE DISEASES.

The Division of Communicable Diseases as now constituted consists of the director and office force at Columbus and a number of medical inspectors located at various points in Ohio. These inspectors are employed only part of the time, as need arises, and their expenses and remuneration are borne as a general rule by the local health organizations which they have assisted. Usually a difference of opinion concerning the diagnosis of a communicable disease is the occasion for their assistance and when local boards of health need help in the organization of the machinery of prevention, the Columbus office furnishes aid. The legislature at the last special session authorized the employment of an assistant epidemiologist and his services will be a welcome addition to the staff of the division.

The functions of the Division of Communicable Diseases may be briefly stated as follows:

Assistance of local health organizations in the restriction and prevention of communicable diseases. This assistance may be administrative in character, such as organizing the machinery of prevention during an epidemic, or special assistance such as clearing up the diagnosis in doubtful cases, enforcing the notification of reportable diseases on the part of physicians, seeking the source of infection in epidemics where the local authorities have failed, and miscellaneous work of this character.

Another, and a very important function of this division, is to increase our knowledge of the sources and modes of infection by statistical studies, by original investigations, and by careful epidemiological studies. In 1912 and 1913, experimental work and field investigations of acute poliomyelitis were carried on by this division in collaboration with the Secretary, and the results published in the *Monthly Bulletin*. Briefly these studies showed that the transmission of acute poliomyelitis by the biting stable fly (Stomoxys calcitrans Linn.) is improbable and no campaign for the extermination of these insects was inaugurated.

A third function of this division, and one of the most important, is the dissemination of knowledge concerning communicable diseases. This has been accomplished by means of pamphlets and the columns of the *Monthly Bulletin*. Pamphlets are distributed through the Public Health Exhibit, and to individuals in communities where disease of a preventable character prevails. The *Monthly Bulletin* has a circulation of over eight thousand and reaches health officers, newspapers, physicians and many other classes of individuals. In addition to these means, lectures on communicable diseases are given by the director of this division in connection with the Public Health Exhibit, which is described elsewhere under the report of the appropriate division.

The fourth and last function of the division is to consider ways and means of improving local health organizations in Ohio. That the present system of local boards of health and health officers is illogical and inefficient is an opinion which has only too much evidence to support it. Very inadequate salaries are paid health officers because the health unit in Ohio is so extremely small. Health officers in some of the larger cities are doing very efficient work. With over twenty-two hundred health subdivisions in a state having a population of approximately 5,000,000, it is obvious that the average health appropriations must be extremely small. Health officials are paid small salaries for part time work, hence their remuneration does not justify a close study of public health work and an energetic application of its principles to the local situation. The logical recommendation is to increase the size of the various health subdivisions so that sufficient appropriations may be secured for full time efficient work. No detailed plan has been worked out and no campaign to favor this result inaugurated, but further study will be made of the feasibility of this plan, and a suitable campaign begun with this end in view. It is my belief that sufficient evidence can be accumulated to show that the present system is not and never can result in efficient public health work, and that a system composed of larger subdivisions and placing more responsibility and commensurate compensation upon health officials will be of greatly increased benefit and heightened efficiency. As mentioned before there are numerous details to be cleared up, but I feel it my duty at this time to point out this very obvious solution to the problem of inefficient health organizations and officials.

The reports of communicable diseases illustrate this point very well. The collection and collation of morbidity reports was taken over by the Division of Public Health Education and Tuberculosis because no appropriation for this work was made for the Division of Communicable Diseases. The reports from health subdivisions have been brought to such a point that nearly all communities are represented semi-monthly. A large number of these reports bear the statement "nothing reported to me" and in many instances this has been found to mean that the physicians did not report to the health officers, and that the latter did not attempt to secure such reports. It is hard to expect health officers who receive little or no compensation to antagonize physicians and heads of families by attempting to enforce notifications of diseases. If the health officer received sufficient compensation to ensure his independence and his position did not alone depend upon political pull or the whims of the board of health, it is probable that the notification of communicable diseases would be enforced without fear or favor, for on such reports would depend his efficiency and the success of his work.

The program of this division as outlined in the 1912 report has been carried out. The plans for 1914 remains to be outlined.

The prevention of typhoid fever is one of the most important phases of the work of this division. The state sustains an annual loss of nearly 1,200 lives from this cause alone, to say nothing of the economic loss sustained because of the weeks spent on the sickbed by nearly 12,000 persons per annum. This number of persons incapacitated for one, two or three months every year means that the wheels of industry are impeded, the army of wage-earners gravely embarrassed, and a serious financial loss sustained by many communities. The typhoid death rate is higher in rural than in urban districts, indicating that the campaign for pure water and sanitary methods of sewage disposal in cities is bearing fruit. Many of our large cities, however, still have death rates that would be considered disgraceful in other countries. In rural districts the campaign for sanitary methods of sewage disposal will be a fruitful means of lowering the typhoid attack rate. Much remains to be done, however, especially on the epidemiological side, in tracing the sources of epidemics, in studying the typhoid prevalence and its causes and in installing emergency methods of prevention in epidemics and threatened epidemics. It is planned to devote as much time as possible to this subject, and to publish the results of these investigations and studies so that the benefits will not be restricted to the narrow limits of the vicinities investigated but will be of service to health officer and health organizations throughout the state.

With the additional help afforded by an assistant epidemiologist it will be possible to make more thorough investigations and to study the sources and methods of transmission of disease more closely. This cannot but result in a more efficient system of health supervision, and an increase in our knowledge of disease prevention.

During 1913, the first cases of ankylostomiasis observed in this state were reported from Loudonville. There is reason to believe that the disease is not uncommon in other parts of the state, among the mining towns and in communities adjoining Kentucky. An investigation to determine the actual prevalence of hookworm disease will be started in the near future.

A considerable outbreak of trachoma occurred in East Youngstown during the past year. There were seventy-six cases and ten of these occurred among school children. The United States Public Health Service rendered assistance during the investigation and was instrumental in securing the adoption of plans suitable to prevent a further spread of the disease. There is some reason to suppose that other communities having a large proportion of foreign-born among the population have not escaped the ravages of trachoma, and investigations will be made from time to time to determine this question.

Reports of communicable diseases appear elsewhere, and it is not necessary to discuss them in detail here. The outbreak of acute poliomyelitis which occurred in 1912 has largely subsided. This disease frequently shows a two-year periodicity and health officials should be on the lookout for it now.

Smallpox has gradually been increasing in extent and in the number of cases, and a widespread and fatal epidemic is feared if local officials do not observe the precaution that are being continually urged. The mildness of the disease leads to many mistakes of diagnosis, and health officers should familiarize themselves with the disease so that they may not be misled. Vaccination is being enforced only in communities where smallpox prevails, and in other places, and in fact in the larger part of the state, an unvaccinated generation is developing. The history of smallpox should be warning enough to cause health officials to campaign for wide vaccination.

Typhoid fever continued to prevail and many outbreaks occurred in the summer and autumn. Following the great flood of 1913, typhoid fever did not prevail to the extent that was feared except in a few localities. In Zanesville, whose water supply is drawn from the grossly polluted Muskingum River and pumped to the consumer without any attempt at purification a large number of cases of typhoid fever developed during the three weeks following the flood. In order to prevent a further spread an emergency hypochlorite plant was installed at once and has been operated nearly continuously since. This plant was intended for temporary use only, as a new system of water supply or a purification plant is to be installed in the near future. The cost of the emergency plant would not have paid the hospital expenses of more than one case of typhoid fever, yet it was instrumental in preventing many cases and deaths of this disease. Typhoid vaccine was also vigorously used and no ill effects resulted. The tables of communicable diseases will give further information concerning the prevalence of transmissible diseases, and the reports which follow give in detail the investigations which have been made.

Very respectfully,

Frank G. Boudreau, M. D.,
Director, Division of Communicable Diseases.

To Dr. E. F. McCampbell,
Secretary and Executive Officer,
Ohio State Board of Health.

REPORTS OF COMMUNICABLE DISEASES.

The following tables summarize the reports of communicable diseases received at the State Board of Health for the year 1913. The totals for the state and for counties must in all cases be considered an understatement of actual conditions. A considerable number of health officers did not report regularly to the State Board, and many others were not able to send in full reports because they failed to secure the co-operation of physicians practicing in their districts.

The first table shows the occurrence of the several reportable diseases by months. In drawing conclusions in regard to the seasonal distribution of these diseases, it must be remembered that the proportion of health officers making reports to the State Board increased very considerably during the second half of the year. It should also be borne in mind that the report cards used prior to June first did not include tuberculosis or ophthalmia neonatorum in the list of notifiable diseases, and hence few cases were reported in the early months of the year.

COMMUNICABLE DISEASES.

MONTHLY TOTALS OF REPORTED CASES FOR THE YEAR ENDING DECEMBER 31, 1913.

	January.	February.	March.	April.	May.	June.
Whooping Cough	670	931	783	865	974	1,289
Measles	3,936	4,397	4,769	4,342	4,501	3,433
Chickenpox	669	607	599	441	323	368
Scarlet Fever	794	683	584	515	447	401
Diphtheria and Membranous Croup	992	724	686	667	529	513
Typhoid Fever	209	183	155	242	309	391
Tuberculosis	22	48	36	17	22	270
Smallpox	160	134	259	207	189	259
Acute Anterior Poliomyelitis.	7	4	5	6	3	6
Epidemic Cerebrospinal Meningitis	22	33	82	68	47	26
Ophthalmia Neonatorum	9	15	19	0	0	9
Trachoma	3	15	68	2	2	3
Totals	7,493	7,774	8,045	7,372	7,346	6,968

	July.	August.	September.	October.	November.	December.	Totals.
Whooping Cough	1,256	677	502	625	669	823	10,064
Measles	1,052	247	248	588	741	852	29,106
Chickenpox	146	102	82	360	858	1,015	5,570
Scarlet Fever	263	324	524	1,068	924	836	7,363
Diphtheria and Membranous Croup	510	684	1,309	2,172	1,767	1,569	12,122
Typhoid Fever	686	1,340	1,490	895	568	395	6,863
Tuberculosis	463	409	383	428	377	447	2,922
Smallpox	135	96	68	201	356	569	2,633
Acute Anterior Poliomyelitis	13	29	25	8	13	6	125
Epidemic Cerebrospinal Meningitis	14	18	19	17	14	16	376
Ophthalmia Neonatorum	20	14	25	26	46	77	260
Trachoma	3	2	7	17	19	3	144
Totals	4,561	3,942	4,682	6,405	6,352	6,608	77,548

TOTALS OF REPORTED CASES FOR 1913, BY CITY DISTRICTS AND BY VILLAGE AND TOWNSHIP DISTRICTS.

	Totals Reported by City Districts.	Totals Reported by Village and Township Districts.	Totals for all Districts Reporting.
Whooping Cough	2,974	7,090	10,064
Measles	16,922	12,184	29,106
Chickenpox	2,901	2,669	5,570
Scarlet Fever	4,351	3,012	7,363
Diphtheria and Membranous Croup	8,833	3,289	12,122
Typhoid Fever	3,395	3,468	6,863
Tuberculosis	2,186	736	2,922
Smallpox	1,257	1,376	2,633
Acute Anterior Poliomyelitis	73	52	125
Epidemic Cerebrospinal Meningitis	275	101	376
Ophthalmia Neonatorum	238	22	260
Trachoma	119	25	144
Totals	43,524	34,024	77,548

Of the 77,548 cases of communicable diseases reported, 43,524 occurred in cities, while 34,024 occurred in villages and unincorporated territory. The comparison of the figures for cities with the figures for rural territory should not be made, even on a per capita basis, for the proportion of delinquent reporters was much higher in country districts than in the cities. The following table shows by county and by city the number of cases of each disease reported during the year.

NUMBER OF REPORTED CASES OF COMMUNICABLE DISEASES FOR 1913 BY COUNTIES AND CITIES.

This table records all cases reported by health officers to the State Board of Health during the year 1913. City totals given separately are also included in county totals.

	Whooping Cough.	Measles.	Chickenpox.	Scarlet Fever.	Diphtheria and Membranous Croup.	Typhoid Fever.	Tuberculosis.	Smallpox.	Acute Poliomyelitis.	Cerebro-Spinal Meningitis.	Ophthalmia Neonatorum.	Trachoma.
1. Adams County	336	13	10	13	127	41	20	......	......	2	......	......
2. Allen County	155	416	41	91	84	48	13	204	......	1	......	......
Delphos	......	5	1	2	1	3	3	129	......	1	......	......
Lima	......	294	39	47	55	11	......	16	......	......	......	......
3. Ashland County	78	136	25	22	9	22	3	1	2	......	......	......
Ashland	......	......	......	19	6	12	1	1	......	......	......	......
4. Ashtabula County	236	311	23	91	115	55	11	......	......	1	......	3
Ashtabula	......	......	......	35	47	8	......	......	......	......	......	1
Conneaut	......	11	5	42	26	15	1	......	......	......	......	......
5. Athens County	308	132	134	71	137	97	32	83	1	1	......	1
Athens	81	61	1	5	12	2	5	......	......	......	......	......
Nelsonville	1	5	8	11	20	7	2	18	......	......	......	......
6. Auglaize County	42	26	25	44	49	45	34	......	......	......	1	......
St. Marys	8	......	......	......	12	9	11	......	......	......	1	......
Wapakoneta	1	14	2	30	17	14	3	......	......	......	......	......
7. Belmont County	296	408	52	97	194	181	23	12	......	3	1	......
Bellaire	54	9	2	10	42	73	8	......	......	2	1	......
Martins Ferry	49	251	4	23	66	......	2	......	......	......	......	......
8. Brown County	275	217	18	3	28	50	15	4	......	1	......	1
9. Butler County	69	455	46	52	524	50	48	86	1	21	......	1
Hamilton	......	280	7	33	388	23	36	80	......	1	......	......
Middletown	......	......	......	14	77	8	......	3	1	19	......	1
10. Carroll County	116	223	5	66	15	16	4	......	......	1	......	......
11. Champaign County	86	12	52	37	9	21	14	15	3	......	......	2
Urbana	33	3	22	1	4	15	8	2	......	......	......	......

12. Clark County	74	177	13	121	154	54	10	152				
Springfield		138	1	86	132	34	10	91				
13. Clermont County	16	459	21	19	47	32	13		1	1	3	
14. Clinton County	17	86	14	23	92	39	4	6		1		
15. Columbiana County	63	364	27	188	262	186	24	5		1		
East Liverpool	4	62	1	56	103	39	3	1				
Salem		27	12	6	41	14	3					
Wellsville	1	51	6	19	24	89	7			1		
16. Coshocton County	71	17	34	3	86	14	5	3				
Coshocton		4		1	65	6	3	1				
17. Crawford County	17	148	14	62	31	35	9					
Bucyrus	7	8	2	41	3	19						
Galion		92		7	13	5	8					
18. Cuyahoga County	1,187	5,894	723	1,194	3,062	463	754	23	37	73	195	100
Cleveland	976	5,242	635	1,043	2,870	437	748	19	33	69	195	100
East Cleveland	143	212	11	45	25	7		2				
Lakewood		143	52	41	37	2	2					
19. Darke County	51	570	42	56	33	116	4	24	1		1	
Greenville		52	12	6	1	8	2				1	
20. Defiance County	82	95	25	32	9	108	20	16	4	5		
Defiance	13	66	8		5	33	16	16	1	2		
21. Delaware County	52	45	26	35	26	34	24	47	3	1		
Delaware			3	11	15	4	21	3				
22. Erie County	53	113	29	39	55	44	28	1	1			
Sandusky		10	23	21	18	23	24	1	1			
23. Fairfield County	61	21	18	98	57	63	11	14	3	1	1	
Lancaster		5	1	46	28	18	3	1				
24. Fayette County	45	27	15	37	12	62	46		1			
Washington C. H.			5	8	3	19	6		1			
25. Franklin County	255	361	318	436	375	208	143	189	10	17	3	1
Columbus	222	295	288	315	341	177	121	140	8	16	3	1
26. Fulton County	80	1	10	37	4	7	8	12	1			
27. Gallia County	82	86	7	36	27	59	17	2		1		
Gallipolis				12	10	5						
28. Geauga County	141	188	20	22	14	6	18					
29. Greene County	69	46	10	62	12	57	6	10				1
Xenia		11	6	21	5	33	2	4				
30. Guernsey County	149	262	27	95	44	85	2	74	1	3	1	
Cambridge	6	153	25	53	11	62		40	1	1		

NUMBER OF REPORTED CASES OF COMMUNICABLE DISEASES FOR 1913 BY COUNTIES AND CITIES — Continued.

	Whooping Cough.	Measles.	Chickenpox.	Scarlet Fever.	Diphtheria and Membranous Croup.	Typhoid Fever.	Tuberculosis.	Smallpox.	Acute Poliomyelitis.	Cerebro-Spinal Meningitis.	Ophthalmia Neonatorum.	Trachoma.
31. Hamilton County	656	3,652	750	673	1,086	328	789	39	9	102	8	13
Cincinnati	458	2,801	572	558	939	263	759	35	8	94	6	13
Norwood	33	277	57	19	51	3	20	1	......	3	......	......
St. Bernard	11	33	37	13	23	17	......	......	......	1	......	......
32. Hancock County	50	543	113	44	60	53	7	29	......	2	......	......
Findlay	......	407	85	25	53	12	6	3	......	......	......	......
33. Hardin County	126	410	34	23	140	86	11	1	......	6	3	......
Kenton	......	24	......	2	65	8	......	......	......	......	......	......
34. Harrison County	268	364	50	18	13	53	8	......	1	......	......	......
35. Henry County	33	110	15	5	8	15	3	2	......	......	1	......
36. Highland County	29	7	24	63	53	36	5	15	......	2	......	......
37. Hocking County	60	4	19	38	45	57	4	5	......	......	......	......
38. Holmes County	47	145	35	1	14	16	3	......	......	2	......	......
39. Huron County	24	145	45	33	14	33	22	21	1	1	......	......
Bellevue	6	29	3	15	4	4	14	6	1	......	......	......
Norwalk	......	26	......	11	6	6	1	2	......	......	......	......
40. Jackson County	104	103	11	26	168	100	8	47	1	......	......	......
Jackson	88	28	4	7	25	14	6	......	......	......	......	......
Wellston	4	6	......	1	76	36	......	32	......	......	......	......
41. Jefferson County	90	737	28	65	174	82	6	4	1	......	......	2
Steubenville	......	425	8	23	97	4	......	......	1	......	......	......
42. Knox County	85	102	54	12	8	62	3	2	1	1	......	......
Mt. Vernon	......	68	12	4	7	11	......	......	......	......	......	......
43. Lake County	28	509	20	15	26	7	13	......	......	2	......	......
Painesville	6	233	8	2	4	1	1	......	......	......	......	......
44. Lawrence County	9	384	40	35	104	81	4	63	......	3	......	3
Ironton	......	205	33	31	33	8	......	8	......	2	......	......

45. Licking County	154	145	121	32	56	93	15	......	2	1	......	......
Newark	......	124	22	17	39	61	......	......	1	......	......	......
46. Logan County	150	252	57	51	25	58	15	19	3	......	1	1
Bellefontaine	81	67	11	28	6	21	4	4	3	......	......	......
47. Lorain County	59	483	115	123	184	75	10	......	3	......	......	......
Elyria	......	35	1	24	30	10	2	......	3	......	......	......
Lorain	7	151	21	81	123	25	6	......	......	......	......	......
48. Lucas County	105	1,678	322	295	333	368	61	339	......	3	29	......
Toledo	86	1,575	289	247	301	338	53	317	......	3	29	......
49. Madison County	69	69	16	16	9	20	9	81	......	2	......	......
50. Mahoning County	236	803	58	412	517	288	46	1	......	1	......	10
Youngstown	149	511	......	283	382	223	42	1	......	......	......	......
51. Marion County	7	1,076	70	52	52	75	21	85	......	3	......	......
Marion	2	708	45	29	28	50	16	70	......	3	......	......
52. Medina County	23	282	132	31	18	22	6	......	......	......	......	......
53. Meigs County	139	39	11	14	5	53	2	43	......	......	......	......
54. Mercer County	15	107	7	11	50	21	10	2	......	......	......	......
55. Miami County	42	547	19	63	61	228	20	8	1	2	......	......
Piqua	2	82	6	21	26	58	5	5	......	......	......	......
Troy	2	13	3	1	7	135	2	......	......	......	......	......
56. Monroe County	4	39	4	9	27	33	4	......	1	......	2	......
57. Montgomery County	38	374	61	214	967	170	55	6	......	2	......	......
Dayton	12	242	49	144	860	113	41	5	......	2	......	......
58. Morgan County	113	8	8	1	3	33	6	17	......	1	......	......
59. Morrow County	10	34	8	1	14	26	8	......	......	1	......	......
60. Muskingum County	24	33	52	122	143	118	6	232	......	1	1	......
Zanesville	......	19	7	60	101	61	1	132	......	......	1	......
61. Noble County	4	63	5	14	29	53	6	4	......	......	......	......
62. Ottawa County	49	32	14	59	45	22	2	3	......	......	......	......
63. Paulding County	146	24	28	24	7	41	1	1	1	1	1	......
64. Perry County	126	312	172	28	53	80	3	95	......	......	......	......
65. Pickaway County	27	5	5	32	7	29	6	......	2	1	1	......
Circleville	......	5	......	6	1	6	1	......	......	......	......	......
66. Pike County	44	15	13	30	27	32	2	......	......	1	......	......
67. Portage County	57	100	21	74	43	61	18	......	1	1	......	......
Ravenna	......	16	......	10	15	8	......	......	......	......	......	......
68. Preble County	2	282	35	83	27	36	21	......	......	4	......	......
69. Putnam County	225	178	71	18	15	74	26	131	4	1	2	......

NUMBER OF REPORTED CASES OF COMMUNICABLÆ DISEASES FOR 1913 BY COUNTIES AND CITIES — Concluded.

	Whooping Cough.	Measles.	Chickenpox.	Scarlet Fever.	Diphtheria and Membranous Croup.	Typhoid Fever.	Tuberculosis.	Smallpox.	Acute Poliomyelitis.	Cerebro-Spinal Meningitis.	Ophthalmia Neonatorum.	Trachoma.
70. Richland County	94	1,031	155	87	91	107	15	....	7	7	1	......
Mansfield	41	778	127	58	30	75	6	....	4	7	......	......
71. Ross County	200	21	23	38	28	124	69	2	......	7	......	......
Chillicothe	61	2	2	11	8	52	63	1	......	1	......	......
72. Sandusky County	18	35	64	31	20	32	4	13	......	......	......	......
Fremont	14	17	40	5	6	17	4	1	......	......	......	......
73. Scioto County	429	376	262	37	207	370	65	53	2	58	......	2
Portsmouth	105	208	104	18	121	241	36	15	1	41	......	2
74. Seneca County	163	174	101	30	81	45	8	5	......	4	......	......
Fostoria	....	....	17	7	18	9	....	1	......	......	......	......
Tiffin	42	58	59	10	37	12	1	1	......	......	......	......
75. Shelby County	35	93	24	27	52	18	3	42	......	......	......	......
Sidney	....	8	....	18	6	3	....	14	......	......	......	......
76. Stark County	53	49	18	237	218	55	13	1	2	......	......	......
Alliance	1	9	2	74	57	4	6	....	......	......	......	......
Canton	1	12	1	54	111	12	1	....	1	......	......	......
Massillon	7	7	4	12	16	6	3	....	......	......	......	......
77. Summit County	85	147	40	265	553	141	9	30	2	7	1	1
Akron	20	43	31	167	403	72	4	22	......	3	1	1
Barberton	....	24	7	6	79	22	....	....	1	......	......	......
78. Trumbull County	124	308	17	69	63	67	10	....	......	......	......	1
Niles	4	17	....	12	4	2	....	....	......	......	......	......
Warren	8	17	1	14	13	22	2	....	......	......	......	1
79. Tuscarawas County	216	293	123	61	161	73	19	2	3	......	......	......
Canal Dover	....	22	....	20	12	24	....	....	1	......	......	......
New Philadelphia	82	51	31	26	30	19	14	1	......	......	......	......
80. Union County	24	61	34	91	12	64	5	14	......	2	......	......

81. Van Wert County	65	60	27	61	10	59	6	75	......	2	1	......
Van Wert	2	15	7	21	4	36	....	8	......	2	......	......
82. Vinton County	57	29	14	39	4	23	5	7	......	1	......	......
83. Warren County	73	220	11	20	26	32	13	4	1	1	......	1
84. Washington County	77	102	37	16	210	87	7	61	......	......	......	......
Marietta	....	....	....	1	51	18	1	2	......	......	......	......
85. Wayne County	174	232	41	18	35	32	12	2	5	2	......	......
Wooster	28	12	2	1	....	3	5	1	2	1	......	......
86. Williams County	21	224	35	38	2	27	16	24	1	2	2	......
87. Wood County	75	81	53	114	18	56	7	19	......	......	......	......
Bowling Green	12	5	8	44	2	16	1	1	......	......	......	......
88. Wyandot County	42	66	4	39	5	32	8	1	......	1	......	......
Total	10,064	29,106	5,570	7,363	12,122	6,863	2,922	2,633	125	376	260	144

SPECIAL REPORTS.

ANKYLOSTOMIASIS IN WASHINGTON TOWNSHIP, HOLMES COUNY.

On August 2, 1913, in compliance with the request of a physician, the epidemiologist visited Washington Township, Holmes County, to investigate some supposed cases of ankylostomiasis.

His report follows:

A physician from Loudonville found a number of persons in Washington Township, Holmes County, who were suffering from a low grade anemia. These patients had a staring expression, showed great weakness, pot belly and other symptoms suggestive of hookworm disease. The history of these cases showed that the first case had contracted the disease in Indiana, where he suffered from a pustular affection of the soles of the feet. About three months afterwards symptoms of his present illness developed. Shortly afterwards his wife and daughter contracted the disease.

The house in which this family live is in an extremely insanitary condition. Sewage is disposed of in a privy which contaminates the surrounding soil. The avenues of infection are, therefore, open. An examination of these patients was made and revealed tenderness in the right iliac region besides the signs and symptoms before mentioned. Bloodsmears were taken from these patients and examination of these revealed a considerable degree of anemia and an increase in the percentage of eosinophils. Specimens of stool were also taken and active parasites (Necator Americanus) and ova were found. The evidence is, therefore, complete that these patients are suffering from ankylostomiasis.

The local authorities were advised of the presence of this disease and recommendations were made with a view to determining the presence of other cases, of controlling all known cases, and to place privies and cesspools in such condition that the infection could not be transmitted as at present. The patients were also instructed in the methods necessary to prevent them disseminating the disease. The physician was advised as to the proper treatment of such cases and he planned to begin thymol administration in accord with Stilis' method at once.

These cases are of great interest as the first to be reported to the State Board of Health in Ohio.

DIPHTHERIA AT DAYTON.

On October 26th, in compliance with the request of Dr. Conklin, president of the board of health, the epidemiologist visited Dayton to investigate the measures in force for the control of diphtheria.

His report follows:

Diphtheria has prevailed in Dayton since the middle of August 1913. Toward the end of September it assumed epidemic proportions and a system of school inspection was established. Bacteriological control of all suspects was strictly enforced. In the opinion of the local board of health these measures have not been effectual. It was the opinion of certain members of the board that the present system of school inspection should be abolished.

The situation in Dayton at the present time is as follows: There are one hundred and fifty-two children in quarantine, the report of some of these cases dating from the beginning of October. Physicians who have no connection with the system of school inspection have reported ninety-four of these cases and the remaining fifty-eight have been detected by inspectors. In twenty-five instances the house has been disinfected and the members of the family are ready to be dismissed. Eighteen cases have been dismissed in the last three days. Of the one hundred and fifty-two cases, twenty-five have occurred in persons not of school age, and one hundred and twenty-seven in school children.

The conclusion to be drawn from this is that the schools still remain the source of infection. Why only fifty-eight of the one hundred and fifty-two cases have been detected by inspectors may be due to two factors: First, physicians and families have been educated to the signifiicance of cases of sore throat, and, second, school inspection is becoming more perfunctory on account of its tediousness and the large number of negative results.

The number of cases of diphtheria reported in October to date is two hundred and thirty-seven. In October 1912, only one hundred and seventy-seven cases of diphtheria were reported from the first to the twenty-sixth instant. A superficial analysis would, therefore, indicate that diphtheria is more prevalent this year than last. When we consider, however, that of the number of cases now in quarantine only ninety-four were reported from physicians not connected with the school inspection and realize that forty percent of the one hundred and fifty-two cases would not have been detected except for this inspection, the evidence is convincing that the number of cases of diphtheria in Dayton at the present time is really less than at the corresponding period in 1912.

During the week ending October 27th, only twenty cases have been detected by medical inspectors and these in a limited number of schools. It appears to the board that if more cases were being reported from the outside than by inspectors, the expense of maintaining the present system of medical inspection was greater than the results obtained.

Such a conclusion is not warranted by the facts. The number of deaths has been greatly reduced, physicians have been educated to submit swabs from atypical cases and sore throats and to release only on two negative swabs. More important still, the death rate from diphtheria has been greatly reduced, only one death occurring in October to date in contrast with sixteen which occurred in October 1912. The comparison of the death rate is the only logical method as a different system of report has been inaugurated by which many more cases are detected this year than last.

It was recommended that the board continue the present system of medical inspection for at least three days. At that time if certain schools continue to show no diphtheria the inspection of such schools could be modified or abandoned and more attention paid to the remaining sources of infection.

The board of health requests that an inspector be sent down at the end of the three-day period to determine the exact steps to be taken and to recommend any changes.

On October 29th, another investigation was made and conditions were found to be slightly improved, but not sufficiently to warrant discontinuing medical inspection, and it was recommended that this be continued for at least a week longer and then gradually diminished, concentrating the attack on those schools from which cases were still being reported. This policy was adopted and proved effectual although not so soon as was hoped.

DIPHTHERIA AT THE BOYS' INDUSTRIAL SCHOOL, LANCASTER, OHIO.

In compliance with requests from those in charge of the Boys' Industrial School at Lancaster, Ohio, the epidemiologist visited that institution on three occasions, September 8th, October 8th, and November 18th, to investigate an outbreak of diphtheria.

His report follows:

The Boys' Industrial School at Lancaster is a reformatory for juvenile male offenders. It is situated among the Hocking hills six miles south of Lancaster in Fairfield County. The boys admitted to the institution are between the ages of ten and twenty-one. The institution is organized on the cottage system, and from fifty to one hundred boys occupy each cottage. There are about one thousand boys in the institution besides officers and assistants.

On September 8th, twelve cases of diphtheria were found in an isolation hospital. These patients came from eight separate cottages and careful investigation failed to reveal the source of the infection. There is a hospital, convenient and modern in construction, consisting of a general ward and a number of rooms, together with dressing and operating rooms. This hospital is not suitable for isolating purposes, but is designed to meet the general hospital needs of the institution.

The diphtheria cases were isolated in an abandoned cottage, which, however, was not large enough to house suspects, exposures, and cases.

After a careful survey of the situation the following recommendations were made:

1. That separate quarters be provided for cases, suspects, and exposures.

2. That the officers of each cottage make a daily examination of all boys under their care, sending any cases showing sore throats to the physisians in charge. Those who showed suspicious signs of diphtheria were to be isolated pending throat culture.

3. That all exposures receive immunizing doses of antitoxin.

These recommendations were carried out as thoroughly as possible by the physician in charge and officers, but cases of diphtheria continued to be reported, and the epidemiologist made another investigation on October 8th. Conditions were found to be about the same as on the previous visit. None of the cases were severe and about half of those who showed diphtheria bacilli on culture showed practically no clinical symptoms of the disease. An investigation into the opportunities for transmitting the infection by means of eating and drinking vessels used in common was made, and it was found that these articles were handled in such a manner that no danger resulted. The evidence pointed conclusively to the fact that healthy carriers were the cause of the spread, and that measures to locate these were necessary. It was decided to culture the throats of all boys and officers in the institution, and to dismiss patients only on two consecutive negative cultures not less than two days apart. The physician in charge and the superintendent agreed with these recommendations and promised to put them in force at once. The need of a building where all boys entering the institution could be detained until such time as it was found that they were not suffering from any communicable disease was urged. On November 18th, another investigation was made, as the routine culture of all the boys was not proceeding satisfactorily. Approximately two hundred and fifty examinations had been made in addition to the large number used for diagnostic and release purposes. There are, at the present time, thirty children in the hospital but none of them have clinical diphtheria. There remain approximately seven hundred and fifty children to be examined. In order to facilitate this work it is recommended that the children belonging to one cottage be examined one day, those belonging to another cottage on the following day, etc. In addition, the authorities of the school were advised to keep a list of all the children who entered the hospital and to make no examinations for release until at least a week had elapsed. If the first culture for release was positive a second need not betaken for another week, but if negative a second could be taken within four days. This will relieve, to some extent, the congestion caused by the submission of a very large number of the cultures to the laboratory daily.

The physician in charge proposes to begin taking cultures on the

20th instant and continuing daily until all children have been examined. It is, therefore, necessary that at least one hundred culture tubes be placed at his disposal daily, as in addition to the routine examinations, cultures will have to be submitted from cases of sore throat and for release purposes.

That the situation is clearing up is demonstrated by the fact that no clinical case of diphtheria has been reported for some time. It is very urgent that all carriers should be detected and isolated until no longer a menace to others.

These measures were successful in finally ridding the Boys' Industrial School of diphtheria. The detention building previously recommended is an urgent need, and with it should be combined a hospital suitable for isolating purposes to provide for the occurrence of another epidemic of diphtheria or other contagious disease.

DIPHTHERIA IN HARRISON TOWNSHIP, MONTGOMERY, COUNTY.

On November 20th, in compliance with the requests of the board of health and the school commissioner of Harrison Township, District Number 2, the epidemiologist investigated the diphtheria situation in that locality.

His report follows:

District School Number 2 is situated in Harrison Township, just outside the corporation line of Dayton. Approximately two hundred pupils attend this school. Coincident with the outbreak of diphtheria in Dayton, a number of cases developed among the pupils attending this school.

On November 16th, the township board of health and the board of education met to consider the situation and the board of health decided that the school should be closed, and certain conditions, which in their opinion were insanitary, corrected.

There were six cases of diphtheria and three of scarlet fever among the pupils. The laity and some members of the board of health were inclined to believe that these diseases were caused by the insanitary conditions above mentioned, namely unventilated and dark basement and insufficient toilet conveniences.

The board of health was advised that these so-called insanitary conditions had absolutely no influence upon the incidence of diphtheria and scarlet fever. They were informed that these diseases were caused by contact, direct or indirect, only and were instructed that the school need not be closed longer than two weeks and that all pupils who had suffered from diptheria should not return to school or be released from quarantine until two consecutive negative reports from swabs taken several days apart and submitted to the Hygienic Laboratories, had been received.

They were further advised that to eliminate diphtheria it might become necessary to examine the throats of all the school children bacteriologically.

No case of diphtheria or scarlet fever has developed among the high school pupils so that it will not be necessary to include these pupils when the preventive measures mentioned above are taken.

DIPHTHERIA AT HURON.

On December 2nd, in compliance with the request of the board of education, the epidemiologist visited Huron to investigate an outbreak of diphtheria.

His report follows:

Huron is an incorporated village with a population estimated at 2000. Diphtheria has been endemic there for at least three months. About three months ago, an Italian came to Huron, with one of the members of his family down with diphtheria. Since, there have been about thirty cases and six families are now quarantined because of this disease. One family is quarantined for scarlet fever. The school, which comprises grammar and high school grades, has twice been closed since diphtheria developed in Huron, and it was last opened on November 15th. While the school was not in session no, or few, cases developed, but as soon as it was opened, new cases arose. No cases have, up to the present, been reported from the high school. The board of education dismissed the pupils of the grammar school for the third time on December 1st, and ordered the building and contents cleansed and fumigated. The mayor appointed, and council approved, Mr. Jacob D. Myer, as health officer, to replace Robert Day who was prevented by physical infirmities from performing the duties of his position. His appointment has not as yet been certified to the State Board for approval.

A meeting of the council, board of education and health officer was called to meet the epidemiologist. Two members of the school board are physicians. These bodies were advised as to the proper methods of quarantine of cases and exposures. They were advised to dismiss cases only on two consecutive negative bacteriological examinations, taken at least two days apart. Exposures, they were informed, could be dismissed on one negative bacteriological report. Inasmuch as there was a feeling that some cultures had not been taken conscientiously, they were advised to appoint a physician to do this work. He should also examine and culture suspicious cases, and assist the health officer whenever necessary. The health officer was informed as to his duties, and how to institute and enforce quarantine. Directions for proper disinfection were also given. It was advised that the lower grades of the grammar school, which are now dismissed, be not opened until a period of fourteen days has elapsed.

Should a case of diphtheria of several days duration be detected in a classroom, such room should be closed. If, however, the case is detected early, it will only be necessary to isolate those who have been in intimate contact with the patient, and ascertain by culture whether they have the specific bacilli in their throats and noses.

All children have been excluded from the motion picture shows, and gatherings attended by children are forbidden by the health officer.

Should none of these measures prove effectual, the routine examination of all school children by cultural methods is advised. The superintendent of the school, the physicians, board of education and council have all shown a disposition to assist the health officer in every particular and he has the support of the better element of the community.

ENTERITIS AT VAN WERT.

On November 22, 1913, in compliance with the request of the health officer, the epidemiologist visited Van Wert to investigate an outbreak of enteritis.

His report follows:

On November 16, 1913, the pumps at the pumping station at Van Wert were stopped, and the only water available for use came from a small tank at the station, used ordinarily to equalize the pressure in the mains. On the 17th instant pumping was resumed. On the 18th instant a number of physicians reported to the health officer that they had observed a large number of cases of enteritis, characterized by diarrhoea, purging, and prostration. No elevation of temperature was noted in any of the cases. None of them lasted longer than three days. About three hundred cases developed up to the 21st instant. After the attack was over the patients appeared to be as well as ever. Every locality in Van Wert was affected, and all about equally. No gathering of any kind had occurred at which all the patients could have met, and no milk route was involved to a greater extent than the others.

An examination of the public water supply was made. The water is drawn from deep wells, and there is no emergency intake from any nearby stream. The reservoir which is utilized for fire purposes only had not been opened, as an examination of the valve showed. The reservoir is not covered and a chamber in which the water is freed from air is also accessible to the public.

There are at least three possible hypotheses to account for these cases of enteritis:

1. Some person may have thrown some poisonous material into the chamber above mentioned. This chamber stands a short distance only from the pumping station which is constantly occupied.

2. The cases of enteritis may have been caused by some article of

food. A new sausage wrapper was distributed over Van Wert shortly before the outbreak. Quite a number of the patients, however, had not partaken of sausages. No other article of food from a common source and liable to be used by all the patients could be found.

3. The watermains could have been contaminated from a leaking sewer or other source. While the pressure existed in the mains no such event was liable to occur, but when pumping ceased contamination might easily effect entrance.

Previous to an outbreak of typhoid fever due to a polluted water supply, a number of cases of enteritis of short duration are often observed, and these are supposed to be due to the mass or ordinary sewage bacteria ingested. (Jordan). It is possible that such is the case here.

Samples of the public water supply were examined in the hygienic laboratories. Of two samples taken at the pumping station no B. Coli were found in one, while an atypical bacillus was found in the other. Of two samples taken from the distribution system (hydrant and faucet) one showed B. Coli in 1 c.c. and 10 c.c. and no B. Coli were detected in the other.

In a water supply derived from deep wells far removed from any sources of contamination, no B. Coli should be found, and their presence is evidence of the entrance of some contamination.

The third hypothesis appears the most logical. If the water in the mains has been contaminated by a leaking sewer or other source it is possible that a number of cases of typhoid fever will develop within the usual period of incubation. Any cases of illness resembling typhoid fever should be carefully watched, so that the development of an outbreak of typhoid fever could be instantly detected and immediate steps taken to prevent an extension of the disease.

NOTE — An epidemic of typhoid fever comprising some forty cases did occur, and was found to be due to contamination of the water supply through a private connection, allowing polluted creek water to enter the mains.

EPIDEMIC CEREBRO-SPINAL MENINGITIS AT ADDYSTON.

On January 7th and 8th, at the request of a member of the board and the health officer of Cincinnati, the epidemiologist made an investigation of some cases of epidemic cerebro-spinal meningitis and the precautions taken to prevent its spread at Addyston.

Addyston, a suburb of Cincinnati, is an incorporated village with a population of approximately 1800. It is situated on the northern bank of the Ohio River, and as the electric railroad connecting it with Cincinnati has a half-hour service for the greater part of the day, the passenger traffic between the city and this suburb is heavy.

On January 2nd, a supposed case of influenza occurred in a boy 17 years of age. Because of the development of untoward symptoms the physician sought counsel, and the disease was pronounced to be a cerebral form of influenza. On January 5th, he developed a muttering delirium and died on the following morning.

On January 4th, a younger boy was seized with the same symptoms as his elder brother, and on the afternoon of the same day a still younger brother took sick. The following day a sister developed the same symptoms, and on the 6th instant the sister and the second brother were admitted to Bethesda Hospital in Cincinnati, where the sister died on the 7th. Previous to this, spinal fluid had been withdrawn and anti-meningococcus serum administered. Examination of the fluid revealed the presence of the meningococcus. The boy was treated in a similar manner and improved steadily.

On January 8th, the youngest brother was seen with the attending physician in Addyston. He was examined with the following results:

F. Mc., male, aged 2. The patient, a boy of stated age lies with eyes closed and head retracted. Respiration is stertorous. This is some herpes labialis. T. 99.8, P. 110. The pupils are dilated, Kernig's sign present. When an effort is made to place the chin on the sternum there is considerable resistance and the pupils dilate more widely. There are some coarse moist rales in the lungs. No delirium is present and there is no evidence of any eruption. Diagnosis: Cerebro-spinal meningitis.

ORIGIN.

As carriers and atypical cases are in large part responsible for the spread of epidemic cerebro-spinal meningitis, it is often very difficult to locate the source of any given cases. The family in which the disease occurred at Addyston had been in Carroll County, Kentucky, for a month, leaving for Addyston December 8th, 1912. The child of one of the neighbors in Kentucky was taken sick shortly before their departure, and died in three days. The children were accustomed to play with this girl. It is possible that the infection was transmitted to one of the children, and that owing to some indiscretion causing temporary lowered resistance the disease occurred. It is well known that there are many individuals not susceptible to this disease, and that the organisms causing it may remain in the secretions of the mouth and nose without giving rise to symptoms. The resistance may then be lowered in some manner and the disease set up.

No quarantine had been instituted, and no precautions taken to prevent its spread. The house was at once placarded, the family instructed that they were quarantined, and provision made for their sustenance. The public school was dismissed until January 13th, and arrangements made to disinfect and fumigate all rooms, and to wash the desks previously occupied by the patients with disinfectant solution. In addition the janitor was instructed to boil all drinking cups and do away with them.

A moving-picture hall which had been attended by one of the patients was disinfected, and the health officer was instructed to see that the automobile which had conveyed the patients to Bethesda Hospital be disinfected.

The house in which the patients lived is a large brick building occupied on the ground floor by a large general store, and above by three families, in two of which there are children. The family in which there are children was quarantined, with the exception of the head, who was instructed to leave the house only to go to work, which did not entail contact with children, and to keep away from all persons as much as possible, especially children.

All physicians who attended any of the families in Addyston, six in all, were visited. They all denied the existence of any cases of influenza with cerebral symptoms, or of any cases of meningitis. They were requested to be on the lookout for such cases and to report any suspicious cases.

CONCLUSIONS.

Physicians in Addyston should be on the alert for cases simulating epidemic cerebro-spinal meningitis, and should withdraw the spinal fluid in any suspicious cases and subject it to bacteriological examination.

Reports of such cases should be made promptly to the health officer.

EPIDEMIC CEREBRO-SPINAL MENINGITIS AT PORTSMOUTH.

On April 8, 1913, the epidemiologist visited Portsmouth to investigate an outbreak of cerebro-spinal meningitis.

His report follows:

On March 1, 1913, a case of epidemic cerebro-spinal meningitis developed in Portsmouth, followed by another on March 12th. From April 1st to the present time thirty-four cases have developed and twelve deaths have occurred. Several of these cases occurred in New Boston, a suburb of Portsmouth, but the first case undoubtedly developed in Portsmouth. After reviewing the situation the following recommendations were made:

1. That all cases of epidemic cerebro-spinal meningitis be isolated in a hospital, a building to be appropriated for that purpose if necessary.
2. That a committee of three physicians appointed because of their special knowledge of nervous disease by the local board of health, visit all suspected cases and aid in establishing the diagnosis.
3. That all suspected cases be immediately reported to the board of health.

4. That Flexner's serum be administered early in every case by a physician selected for his skill in lumbar puncture. In addition the following recommendations were made:

1. Isolation of the patient, if possible in a hospital, and screening to keep out insects. Domestic animals should be excluded from the room.

2. Disinfection or destruction of all discharges, especially the sputum and nasal secretions and excretions from the intestines. Nurses and physicians should observe the same precautions regarding their hands and clothing as in attending a case of scarlet fever.

3. A modified quarantine should be observed. Other children in the family should certainly be excluded from school. The bread-winner may be allowed to work. Three weeks should be the MINIMUM period of isolation and quarantine, and children should be forced to remain at home for three weeks following disinfection.

4. When this disease is present in a community, public gatherings which children will attend should be discouraged.

5. Members of the family and those exposed should use a spray consisting of 1% of hydrogen peroxide under advice of their family physician.

6. As soon as practicable after recovery of the patient, the house should be disinfected with formaldehyde.

7. The attention of physicians should be directed to the fact that abortive cases are often associated with typical cases. A committee of physicians should investigate and report upon such cases.

8. Epidemic meningitis has been declared by the State Board of Health to be a reportable disease. This means that all cases must be reported by physicians to the health officer and by the health officer to the Secretary of the State Board of Health.

9. Cases must be isolated and quarantined on suspicion in accordance with the law.

10. Flexner's serum should be administered early by a physician skilled in its use, if necessary at public expense.

A physician had already been selected by the board of health to make bacteriological diagnoses and to administer the serum, and the board of health promised that the recommendations would be carried into effect as fully as possible.

OUTBREAK OF FOOD POISONING IN BELLEFONTAINE.

On August 13, 1913, in compliance with the request of the health officer, the epidemiologist visited Bellefontaine to investigate an outbreak of food poisoning.

His report follows:

On Sunday, July 15, 1913, from sixty to eighty persons ate dinner at noon at a certain restaurant in Bellefontaine. From forty to forty-five of these took sick between 11 P. M. Sunday night and about 2 P. M. Monday afternoon. The symptoms consisted of purging, nausea and comiting, vertigo, severe prostration, some delirium, and inability to retain any food. The death resulted, both in aged individuals.

The menu for the dinner consisted of roast pork, beef and veal, potatoes, canned corn, pickled beets, fresh tomatoes, a rice pudding with egg dressing, and pies of various kinds. Iced tea, coffee and milk were also served.

An investigation of each case was made by the health officer and a sanitary policeman, and the kind of food used by each patient ascertained. The only article of food used by all the patients in common was the rice pudding and dressing. Only one kind of meat was served to each person. Other portions of meat from the same animals were sold to other customers and no illness resulted. Canned goods from the same shipment and boxes were sold to a number of families and no sickness occurred. Several patients had eaten only the rice pudding, and they were just as prostrated as were others who partook of the whole meal.

These facts were confirmed by a personal examination. Unfortunately all of the food had been consumed and the restaurant cleaned up and closed before the fact became known that a large number of its patrons had shown symptoms of food poisoning. Many of the latter had left the city and could not be found.

The questions that suggested themselves were:

1. Were the cases if illness due to metallic poisoning?

2. What article of food was responsible?

3. If not a metallic poison, what was the nature of the toxin or ptomaine?

4. To what was the development of this toxin or ptomaine due?

In answer to the first question only indirect evidence can be given. A number of patients did not partake of any portion of the canned goods. Could a metallic poison be introduced into the food during or following the preparation? This is, of course, a theoretical possibility. If this were done it must have been accidental, or there must have existed a motive for such an act. No metallic poison had been sold to anyone engaged in caring for the food as far as could be ascertained. The cook who prepared the rice pudding had been discharged and re-engaged, coming on duty the day before the poisoning occurred. She had denied any sickness, although observed to have visited the toilet a large number of times the following morning. Her illness was evidently of a milder nature than that of the others. There is no evidence that any blame can be attached to this woman, nor is there any evidence that a metallic poison could have been responsible. According to the statement of the manager of the restaurant, apparently an intelligent and conscientious woman, no poisons of any kind were kept on the premises except a liquid spray for cockroaches, which had been taken from the restaurant to another house several days before the outbreak.

As to the article of food that was responsible, this was determined by a process of elimination, as stated above, to be a rice pudding and its dressing. This article of food was described as follows: "This pudding was made of rice, corn-starch, milk, and covered with a dip of water, sugar, the yolks of four eggs, and four peeled oranges chopped fine." The rice, cornstarch and oranges may be eliminated; it is probable that the eggs or milk were at fault. This dressing or "dip" was made on Saturday afternoon and kept in the refrigerator until Sunday noon. The wife of the proprietor of the restaurant tasted the pudding and dressing and commented that it was not so appetising as usual, there was a "queer taste" which she could not describe. However, the patrons did not notice this unusual taste and all the pudding and dressing were eaten.

In commenting on food poisoning, H. Batty Shaw summarizes his views as follows:

> 1. "Food poisoning, in an increasingly large proportion of cases, is due to the action of pathogenetic organisms which are either present before death in the animal from which such food was obtained or have subsequently gained access to such food. In both cases the human being may suffer from toxic effects either immediately or only after an interval — the period of incubation. The duration of the incubation will depend upon a number of circumstances, such as the virulence of the organism, the resistance of the individual and so forth."
>
> 2. "Ptomaine poisoning, which was originally held to be responsible for various epidemics of food poisoning, is a very restricted possibility. Decomposed food is rarely an attractive article of diet, and even when high game or cheese is eaten in considerable quantity, toxic symptoms are exceptional or entirely absent. In many cases of food poisoning the food consumed has appeared to be quite free from putrefaction, as tested by the sense of smell. However, it is admitted, by those who believe in ptomaine poisoning, that many ptomaines are much less toxic than the fluids from which they were separated."
>
> 3. "It is impossible to deny that a few ptomaines, such as mydaleine and tyrotoxicon, may occur in tainted food before ingestion, or may develop during intestinal decomposition and cause toxic symptoms, referable to local disturbances of the alimentary tract, or in the case of mytilotoxine, of the central nervous system also."

Tyrotoxicon is a crystallizable substance first isolated by Vaughan of Michigan from some cheese which was responsible for an epidemic of food poisoning. He considered it the result of putrefactive changes in the food, but was unable to discover the causative organism. Since 1884 it has been found in milk, ice cream, custards, and milk products. The symptoms resulting from the ingestion of this toxin resemble in many respects those described by physicians in Bellefontaine of their patients.

A more common method of poisoning by milk and milk derivatives is caused by their infection with organisms obtained from the milch cow or introduced later. Dr. Klein found the Bacillus *enteritidis* (Gärtner) in ten samples of milk, and pointed out that in warm weather this bacillus would rapidly increase without altering the appearance of the milk. The symptoms caused by infection with this and allied organisms are gastro-intestinal and in some cases nervous, and resemble those described by Bellefontaine physicians.

Botulism, or symptoms caused by the toxin of Bacillus *botulinus*, is, as a rule, easily recognizable. Diarrhoea and vomiting are usually absent, or only slight or transitory, while constipation of an obstinate character and retention of urine are constant and characteristic. The nervous system chiefly is involved and double vision, ptosis, dilatation of the pupils, aphonia and dysphagia are common.

To what was the development of this toxin or ptomaine due? It is impossible to answer this question, since all of the food was consumed before any investigation was begun. The post-mortem examination of one of the two victims revealed nothing of importance, and the report is not sufficiently interesting to quote here.

Food poisoning is by no means so infrequent as is commonly supposed. Reports of several outbreaks, not, it is true, of the same magnitude as the present one, have come to this office within the last year. What course should a health officer pursue when cases of food poisoning occur within his jurisdiction? In the first place, rigid inspection of meat and meat products, and of milk and the dairies in which it is collected and prepared, will do much to prevent the occurrence of food poisoning. An organism which Vaughan found in food while seeking the causal organism of tyrotoxicon, and the endotoxins of *B. enteritidis* are both capable of resisting a temperature higher and for a longer period than is usually used in cooking. A temperature of 100°C (boiling) for thirty minutes does not serve to destroy the endotoxins of B. enteriditis although quite sufficient to destroy the organism itself. So thorough cooking will not in all cases serve to obviate the danger of food poisoning.

Meat from any animal which has suffered from enteritis previous to slaughter may give rise to symptoms of food poisoning when consumed. If enteritis is suspected cultures should be made from deep cuts in the meat after slaughter or some of the muscle juice used for agglutination reactions with the various members of the group of *B. enteritidis*.

To prevent putrefaction and the resultant sickness occasioned by the products of decomposition, food should be stored in suitable ice chambers, and all food which does not appear wholesome should be condemned. Great care should be exercised in inspecting the manufacture of sausages and other meat products, and the meat which is used for this purpose should be above suspicion. All gelatinous material favors the development of *B. Botulinus*, and this organism effects little change in the food. Fortunately this organism is easily destroyed by a temperature of 80°C, and pickling in a 10 percent solution of salt will prevent its development.

The question of poisoning by mussels, clams, and shell fish and by mushrooms does not enter into the present situation.

Milk should be taken only from healthy cows and after thorough aeration, should be kept tightly covered in an ice chamber. Under no circumstances should it be placed in a chamber with decomposing food.

When an outbreak of food poisoning occurs, the health officer should hasten to find its source, stop the sale of all food from the store or restaurant concerned and endeavor to ascertain the particular article of food responsible by taking a history of each case, and checking off each article on the menu. Meat and meat products should be the first articles suspected, and a history of the animal and of the meat after slaughter taken with care. Afterwards milk, eggs, shell-fish, and all albuminous and gelatinous foods should be carefully investigated. As large a sample as possible should be sent to a laboratory together with a summary of all the information collected and the reasons for suspecing the particular article of food in question. Canned goods usually spoil after being opened, when the contents are allowed to remain in the original tin and exposed to the atmosphere of the room. Occasionally, however, poisoning is caused by improper or careless canning processes. Metallic poisoning may rarely result from such a cause.

It is to be regretted that the force of circumstances forbid a closer analysis of the epidemic of food poisoning at Bellefontaine, but if it will serve as a warning and suffice to keep health authorities in this state on the alert, it will have accomplished a great deal. Cases of food poisoning are distinctly preventable and come under the jurisdiction of the health officer just as certainly as do diphtheria and smallpox. Any information relating to cases or outbreaks of food poisoning will be welcomed.

MILK SICKNESS AT URBANA, OHIO.

On September 29th, in compliance with the request of a physician, the epidemiologist visited Urbana to investigate an outbreak of supposed milk sickness.

His report follows:

Fifteen or twenty years ago, milk sickness existed on the farm now occupied by Mr. C. and family. The former owner of the farm died of this disease, and his cattle were affected. A wooded pasture in which the cattle took sick was then fenced off and has not been used since. During the early part of August 1913, a cow belonging to a neighbor, but pastured with Mr. C's herd, took sick and died. The veterinary surgeon who attended the case was in doubt whether the disease was milk sickness or so-called "buckeye" poisoning. The carcass of this animal was buried in the fenced off pasture. A few days later after breaking into this pasture, several of Mr. C's cows took sick, and two died, both milch cows. The sucking calves were not affected. A young bull also took sick but recovered under treatment. Another milch cow took sick and died about September 21st. In all seven head of cattle were affected and three died. The first which were seized showed symptoms of lassitude, languor, weakness, trembling after exertion, and drooping of the head, as well as other nervous symptoms. Stumbling and weakness of the front legs was noticed. Two horses died about September 20th, one with symptoms of meningitis. The veterinarian stated that their symptoms were not at all similar to those exhibited by the cattle. On September 19th, two of the farmer's children (female, aged 13, and male, aged 21,) took sick. For two or three days prior to this date they had experienced a feeling of lassitude and were constipated. The onset began with vomiting and intense weakness which forced them to take to bed. The vomiting continued and constipation remained until relieved by cathartics. Vomiting was accompanied by burning pains in the stomach, relieved in one case by taking food. Slight exertion increased the vomiting, which was obstinate, frequent and accompanied by considerable nausea.

On examination the patients appeared to be well-developed and of about stated ages. The cheeks were flushed and the eyes congested. The temperature was subnormal in both cases and in both the pulse was regular, full and not accelerated. The abdomen was flat and flaccid and no signs of pain or tenderness was shown on pressure. The liver was not enlarged nor was the spleen palpable. The mouth was open, the lips dry black and cracked, and the teeth covered with sordes. The tongue was dry and furred. The skin felt hot and dry. The girl was vomiting no longer, but the boy vomited several times during the examination. The vomitus was liquid, with greenish flakes, and contained some "coffee grounds" material. The patient strained considerably before he was relieved by vomiting. A third patient (male, aged 17) was taken sick on the 22nd instant. His symptoms tallied exactly with those of his brother and sister. A peculiar feature of all the cases was the constant absence of any elevation of temperature, and indeed the thermometer constantly recorded a subnormal temperature.

Specimens of blood were taken and examined for agglutinins for B. typhosus, but the reaction was negative.

It is probable that this illness was really milk sickness contracted by drinking milk or eating butter from the sick cows. Several persons in Urbana who used milk and milk products from these cows, were seized with an illness corresponding to that described above.

Milk sickness used to be fairly common in Ohio but for the last thirty or forty years it has become increasingly rare. Its cause is not known although a bacterium has been described. Various weeds and plants have also been thought to cause it, but no evidence of a satisfactory nature has been adduced in support.

The family among whom these cases occurred was instructed to stop the sale of any milk or milk products from the sick cows.

PELLAGRA IN MARK TOWNSHIP, DEFIANCE COUNTY.

On August 16, the epidemiologist investigated a case of suspected pellagra in Mark Township, Defiance County, at the request of a physician in Auburn, Indiana.

His report follows:

The patient, a male, aged 40, was born and reared in a farming district in Mark Township, Defiance County. Most of his life has been spent on a farm. In 1911 he went to Michigan, where he worked in a turpentine factory until the winter of 1912, when he returned home.

There is no significant personal or family history. The present illness began in May 1913, when the patient began to experience languor, vague pains in the legs, and inability to carry on his usual labor in the fields. These symptoms gradually grew worse, with some remissions, and to them was added anorexia, abdominal distress, marked eructations of gas and dizziness. Diarrhoea soon was added to the distressing picture, and the stools showed traces of blood. Despondency became a habit and the nervous symptoms increased. The cutaneous signs began to appear in June and involved those parts of the face, hands and forearms exposed to the sun. The picture was that of a pustular dermatitis. and the skin was reddened, thickened and pustules and blebs were scattered over the whole surface. At one time the whole area involved was bathed in pus.

On examination the patient was found to be a man of about stated age, and compelled by weakness to assume a dorsal decubitus. The face, hands and forearms and the lower third of the legs (to a lesser degree) showed a thickened tumid skin, with scars of recently healed pustules. There were a number of pustules scattered over the whole body. The skin was cracked and reddened. Muscular weakness was pronounced, despondency was marked, and delayed cerebration was a feature. A severe type of onychia affected the finger and toe nails. Diplopia was present and vision was reduced. There was fluid in the abdomen and oedema of the legs, including the penis and testicles, and of the face, although the urine was said to be normal, containing no albumen.

Although there are many features in this case that are obscure yet a tentative diagnosis of pellagra may be accepted for the present. The case will be followed and further and more complete examinations made.

The case is of intense interest as it is the first to appear in Ohio as far as official records show. Other cases in Ohio have been imported but this is the first to occur here.

PEMPHIGUS SYPHILITICUS AT MARION.

On December 13, 1913, in compliance with the request of the health officer, the epidemiologist visited Marion to investigate an eruptive disease said to resemble smallpox.

His report follows:

The patient, male, black, aged one day, was born with an eruption which the attending physician said was characteristic of smallpox. The mother gave no history of smallpox, nor could evidences of a previous attack be found on her body. Quite a number of copper-colored spots were scattered over her body and extremities. She had miscarried three times before bringing a child to term, and previous to the birth of this child she had a rash which she could not describe. She stated that the first child also had a rash at birth.

The patient is apparently a normal child of stated age. The eyes are closed and slightly inflamed, and contain an abundant muco-purulent discharge. The nostrils are slightly inflamed and there is an abundant serous discharge. The palms of the hands and soles of the feet, the extremities and face to a lesser degree, and the body to a still slighter extent, show bullae of various sizes. These are superficial unilocular, and contain a serous fluid. When the covering is removed an ulcer-like surface is exposed. There is also to be noted a less abundant eruption resembling an erythema, on the back and limbs.

This disease is in all probability pemphigus syphiliticus, and bears little resemblance to smallpox.

SCARLET FEVER IN BOKES CREEK TOWNSHIP, LOGAN COUNTY.

On July 19th, in compliance with a number of requests, the epidemiologist visited Bokes Creek Township, Logan County, to investigate the prevalence of scarlet fever.

His report follows:

Several cases of an eruptive disease had occurred, and one physician diagnosed the cases as scarlet fever while another physician declared they did not resemble that disease. At the present time there are two acute cases whose eruption and clinical features are characteristic of scarlet fever. There are several other children who are desquamating, who have evidently had scarlet fever. Two of the families in which these cases occurred sell milk. Scarlet fever is frequently conveyed by milk so the health officer was instructed to stop these supplies until the patients have entirely recovered. Literature and instructions were also given the health officer. Little further spread of the disease is anticipated.

SCARLET FEVER IN GROVE CITY AND JACKSON TOWNSHIP, FRANKLIN COUNTY.

On January 27, 1913, upon request, the epidemiologist visited Grove City and Jackson Township to investigate an outbreak of scarlet fever.

The report follows:

Fifteen cases of scarlet fever have been reported from Grove City and Jackson Township within the last six weeks, five of these being in the township. Four cases were reported for the week ending January 25th. The outbreak is traceable to a patient of the Deaf and Dumb Institution who was the first to show symptoms of scarlet fever. The public school in Grove City was closed during the two weeks ending January 28th. Disinfection was performed by the janitor of the school, who, because of his inexperience, had not used enough material to render the process efficient. A pupil attending the high school was taken sick on the 24th instant, and exposed many other pupils. A street car motorman was found to be at work between Grove City and Orient while a member of his family had scarlet fever.

In view of these facts the public school was closed and the health officer instructed to disinfect it according to the methods recommended by the State Board of Health. As the quarantine had been ignored in some instances, the health officer was instructed in his duty concerning quarantine and exposure. The motorman was required to have his clothes disinfected and remain at the home of his neighbors or be strictly quarantined at his own home.

Some of the families were visited and instructed to maintain the quarantine and were informed of the penalty imposed when a quarantine was broken. The high school mentioned previously was ordered disinfected by the health officer and closed while this was being done.

An inquiry into the milk supply revealed the fact that there were no cases of scarlet fever at the homes of the distributors and that said distributors were not allowed to leave bottles or exchange tickets at homes which were quarantined.

These steps proved sufficient to control the outbreak.

SCARLET FEVER AT ZANESVILLE.

On February 27, 1913, in compliance with the request of the health officer, the epidemiologist visited Zanesville to investigate an outbreak of scarlet fever.

His report follows:

Several cases of scarlet fever developed in Zanesville during January 1913, but it was not until February 13, 1913, that the disease reached epidemic proportions. Since that date seventeen cases of the disease have developed in sixteen families. These cases are practically all in the same neighborhood and are all supplied by the same dairyman. Only seven of the seventeen are of school age, and the school can, therefore, be ruled out as a source of infection.

The dairyman in question supplies over one hundred families, and distributes about twenty-four gallons of milk daily. His cows supply eighteen gallons and six gallons are secured from two supply houses, each contributing three gallons. There were no cases of scarlet fever at the home of the dairyman, or at either of the supply houses. No bottles are left at the homes of the patients when the house is quarantined, but the milk poured into receptacles set out by the quarantined families. This is, of course, not done in early cases before quarantine is instituted. The dairy is not equipped with a modern sterilizing apparatus, and the milk is not pasteurized.

One authority states that only thirty-eight per cent of children who have not had the disease contract scarlet fever when exposed to it. It is, therefore, evident that nearly all the susceptible children on this dairyman's route have or have had scarlet fever, since a number contracted the disease in January.

Because of these facts it was recommended:

1. That the sale of this milk in Zanesville be immediately stopped and that a thorough investigation be made to determine the manner in which the milk became infected. It was stipulated, however, that if the dairyman installed a sterilizing and pasteurizing apparatus, the sale of the milk could be continued. The "flash" method of pasteurizing should not be used.

2. That the law must be complied with in regard to exposures to scarlet fever, and that children in a school room in which a case of scarlet fever developed should be considered as exposures.

3. That more expert assistance is needed in the health department of Zanesville as mentioned in a previous report, and that physical supervision of school children would be of great help in preventing and restricting contagious disease.

SMALLPOX AT ALVORDTON.

On June 15, 1913, in compliance with the request of the mayor, the epidemiologist visited Alvordton to investigate an outbreak of smallpox. His report follows:

Alvordton is a village with a population of 402, situated in Williams County, about four miles distant from Michigan. On May 31, 1913, a case of smallpox was reported to the health officer of Alvordton and it was found that cases had been existing for three weeks previous to this date. An inspector of the State Board of Health was sent to confirm the diagnosis and recommend measures for the control of the disease. By request of the health officer the inspector attempted to investigate a suspected case of smallpox but the head of the house refused him admittance and the health officer failed to take the proper steps to ascertain the nature of the disease from which different members of this family suffered. On June 16, the members of this family were examined and it was found that four of them had smallpox.

Since the local health officer, acting in lieu of a board of health, had failed to carry out the preventive measures which were recommended to him by an inspector and from the office of the State Board of Health, it is recommended that Dr. Schaffer be appointed to take charge of the outbreak and that his compensation be fixed as follows:

For fumigation	$5 00
For each call	2 00

These calls comprise investigations for new cases of eruptive disease and medical attention to quarantined persons. The outbreak is traceable to a family who recently came to Alvordton from Michigan. It is believed that all cases are now quarantined and the large majority of exposures vaccinated.

Dr. Schaffer was informed that if he were appointed to take charge of the outbreak his duties would be to enforce quarantine, to investigate all suspected cases and to vaccinate or quarantine all exposures. Dr. Schaffer has the support of the mayor and council and a large majority of the citizens of Alvordton.

SMALLPOX IN BARLOW TOWNSHIP, WASHINGTON COUNTY.

On May 9, 1913, in compliance with the request of the health officer, the epidemiologist visited Barlow Township, Washington County, to investigate an outbreak of an eruptive disease.

His report follows:

Barlow Township is situated among the hills of Washington County and is sparsely settled, a considerable proportion of the population being composed of negroes. Barlow Postoffice is about fourteen miles distant from Marietta and about the same distance from Broadwell, where cases of smallpox have occurred, during the early months of 1913. The only railroad in Barlow Township is the M. C. & C., which operates between Palos and Marietta and through Broadwell, Cutler and Lathrop, where smallpox has been prevalent.

Four individuals convalescing from attacks of an eruptive disease were examined and in all of them the prodromal symptoms, onset of the eruption, and distribution of the lesions were identical with smallpox. Two of these gave histories of having had attacks of chickenpox previously and none had ever been vaccinated. The appearance of the eruption at the time of examination was not distinctive as only the stains or a few crusts remained.

The presumptive evidence was very convincing, however, that the disease was smallpox and the health officer was so informed. None of the patients at the time of the examination were dangerous to other individuals.

This type of smallpox is identical with that found at Cutler, Broadwell, and Lathrop, and its mildness has been very misleading to physicians whose experience of smallpox is limited. Its occurrence in adults, most of whom have had a previous attack of chickenpox, and many of whom have never been vaccinated, at least never within recent years, the distribution of the eruption, and the type and severity of the prodromal symptoms, should guide the careful diagnostician, even if the specific characters of the eruption are misleading.

The board of health of Barlow Township should take immediate steps to investigate these cases and quarantine all exposures, especially the families of the patients. Vaccination should be recommended and all children attending school should be required to present a certificate of recent and successful vaccination before admission. It is proper for the expense of vaccination to be borne by the township.

The fact that the disease has been present for some time in Barlow Township and has not spread very widely, is no reason why every precaution should not be taken immediately for it is a well-known fact that smallpox smoulders in many communities until circumstances favor, when it blazes up, and preventive measures are very much less effectual after than before this event.

SMALLPOX AT BELLEVUE.

On September 17, 1913, in compliance with the request of the health officer, the epidemiologist visited Bellevue to investigate a case of eruptive disease in which the diagnosis was in doubt.

His report follows:

On September 11, a girl aged six began to complain of headache and aching in the limbs. She appeared to be feverish and the thermometer showed an elevation of temperature. On the 12th instant an eruption appeared on the right side of the abdomen and extended rapidly over the whole body. On the 14th instant all symptoms of illness disappeared except the rash. On the date of the investigation the child was found to be covered with an eruption vesicular in character and rather superficial which was most abundant on the chest and abdomen and back, but was also present on the extremities and on the soles of the feet and the palms of the hands. The individual lesions varied in size, in appearance and in the stage of development.

The patient had been at Williamstown, Hancock County, during the stage of incubation and had been exposed to some cases of supposed chickenpox. Although the case was by no means clear, the board of health and the health officer were advised to treat the case as one of smallpox. No exposure during the stage of eruption had taken place except in the immediate family. On the 19th instant the health officer notified this department that the diagnosis of smallpox was no longer in doubt as the eruption had become pustular and secondary fever was present.

SMALLPOX IN BERN TOWNSHIP, ATHENS COUNTY, AND IN WESLEY AND FAIRFIELD TOWNSHIPS, WASHINGTON COUNTY.

On February 20th, 21st, 26th and 27th, the epidemiologist visited Bern Township, Athens County, and Cutler and Bartlett in Fairfield and Wesley Townships, respectively, in Washington County, to investigate a number of cases of eruptive disease which had occasioned a number of complaints.

The report of his investigation follows:

Lathrop is a small, non-incorporated village in Bern Township, populated by miners and their families. A large majority of the miners are employed by the Black Diamond Company which mines coal.

A miner about thirty years of age, was taken sick on the 13th instant with severe lumbar and sacral pains, intense frontal headache and chilly sensations. He was feverish and prostrated. On the evening of the 16th instant an eruption appeared on his forehead and arm and shortly after on his body and legs. A physician was called and pronounced the disease smallpox. The patient was at once quarantined and the disease reported. Another physician who was called was of the opinion that the disease was chickenpox, and the township board of health wished to have the matter settled and appealed to the State Board of Health.

At the time of the investigation the patient was in the pustular stage of the disease, which was typical of smallpox. The pustules were massed on the forehead and face, wrists and extensor surfaces of the legs, and to a less extent on the body and palms of the hands and soles of the feet.

A meeting of the township trustees was called, and they were advised to vaccinate or quarantine all exposures. It appeared that nearly all the inhabitants of the village had been subject to exposure, and it was advised that it would be best to work in conjunction with the company and insist on the vaccination or quarantine of every family in the village. The board of education was advised to require a certificate of recent and successful vaccination from all pupils of the schools.

Guards were appointed to see that quarantine was observed in all cases where vaccination was opposed.

On February 23rd a physician again saw the case and pronounced the disease chickenpox. This interfered with the enforcement of the vaccination and quarantine measures to a degree and the State Board of Health was again asked for help. A meeting of the trustees was again called, and they were instructed to see that the measures recommended previously were carried out. A number of families who opposed vaccination and had been quarantined were visited, and all were vaccinated without opposition and the quarantine terminated.

The trustees provided the services of a physician to perform vaccination at the township's expense, and as nearly all the inhabitants of the village as well as school children have been vaccinated a further spread of smallpox, after one or two cases which must be expected, is not anticipated. On request the company kept the mine in operation to prevent disorder.

There have been a number of cases of an eruptive disease in Cutler and vicinity in children and adults. All of these, with one exception, have been reported as chickenpox. A woman, eight months pregnant, was attacked by the disease and miscarried. This case was pronounced chickenpox by the attending physician, but was reported as smallpox by two other physicians who saw the case. This patient was visited and the diagnosis of smallpox confirmed. The disease was in the late crust stage, and the patient was at the point of death. There were no puzzling features about this disease; it was typical of discrete smallpox. The husband of the patient and two other members of the family showed the brown stains left after discrete smallpox, and some pitting, and a history of a disease resembling smallpox was elicited. All had had chickenpox previously.

A negro was reported as having a suspicious eruption and was visited. He showed the symptoms and signs of a well-marked case of smallpox. Three members of the family with whom he was boarding gave a history and showed symptoms of having passed through an attack of smallpox. All had had chickenpox previously and none were vaccinated.

A meeting was called of the trustees of the townships in which these cases developed. They were advised to take immediate steps to secure the vaccination or quarantine of all exposures and to quarantine the cases. It was also recommended that they secure the services of a physician conversant with smallpox and its prevention to investigate the exposures and to vaccinate and disinfect where necessary. It was recommended that the board of education adopt a resolution requiring that children attending school present a certificate of recent and successful vaccination. It was advised that in order to make vaccination as general as possible it should be performed at the expense of the township.

These recommendations were approved and adopted by the trustees.

In searching for the possible source of these cases of smallpox it was found that they had been to Zanesville and according to their own history, had come in contact with cases of smallpox there. No other history of exposure could be elicited.

If the trustees take prompt action along the lines suggested to them, the further spread of smallpox in the townships mentioned should be prevented.

Note — One other case of smallpox was reported from Lathrop. In the townships the authorities were put to considerable trouble and expense because the measures of prevention had not been put in force early enough.

SMALLPOX AT CAMBRIDGE.

On January 29, 1913, in compliance with the request of the health officer, the epidemiologist visited Cambridge to investigate an outbreak of smallpox.

The report follows:

On December 30, 1912, an individual who had been at Zanesville on several occasions during the probable period of incubation, was seized with the symptoms of an eruptive disease which was pronounced smallpox by the attending physician and so reported. Two or three more cases occurred which were carefully quarantined. On the 23rd instant ten cases were reported and this occasioned much alarm among the laity. The question of closing all public gatherings, including schools, was raised but as the board of health did not take this view such gatherings were allowed to remain open. Attendance at school was made conditional upon recent and successful vaccination and all exposures which could be traced were vaccinated and in some instances quarantined. The last case developed on the morning of the 29th, making a total of twenty-one cases. In several instances there had been a difference of opinion concerning the diagnosis.

At a meeting with the board of health it was recommended that employers of labor insist upon the vaccination of all their employees. It was also recommended that the term "exposure" be interpreted as liberally as possible and that vaccination be made easy of access to all. The cases in which there had been a difference of opinion were visited and the diagnosis of smallpox confirmed in each instance. Several cases may occur within the next two weeks but after that period few or no cases should develop as the measures taken by the board of health appear to be sufficient to control the situation.

SMALLPOX AT CENTERBURG.

On December 27, 1913, in compliance with the request of the health officer, the epidemiologist visited Centerburg to investigate some cases thought to be smallpox.

His report follows:

Centerburg is an incorporated village with a population of approximately 800 inhabitants, and situated in Knox County. On December 20th, two adults contracted an eruptive disease which the attending physician diagnosed as smallpox and reported to the health officer. As the disease in both instances was extremely mild, some doubt existed as to the diagnosis and aid was asked of the State Board of Health.

The cases were examined and pronounced to be smallpox. The exposure is traceable to Delaware. A nurse with a mild case of smallpox came to Centerburg from Delaware and exposed the persons who now have smallpox. The authorities at Delaware were advised of this occurrence. The health officer of Centerburg was instructed to vaccinate or quarantine all exposures, to investigate all suspicious cases and to disinfect the premises of quarantined patients when they had recovered and were no longer liable to communicate the disease to others.

NOTE — No further spread of the disease took place.

SMALLPOX IN CENTER TOWNSHIP, GUERNSEY COUNTY.

On March 12th, in compliance with the request of the health officer of Cambridge, the epidemiologist visited Center Township, Guernsey County, to investigate an outbreak of smallpox.

The report follows:

Center Township is in a part of Guernsey County rich in coal, so that there are a number of mines which employ a large number of miners. In one of these mines, known as the Forsythe Mine, several cases of smallpox developed. Some of these cases did not call a physician, and exposed many persons. On March 12th, two cases were found, one in the pustular stage and one in the crust stage. Nine other individuals, members of the same families, showed stains characteristic of smallpox, and the history proved that all had had smallpox. It was practically impossible to ascertain the source of exposure, further than that these people had travelled to and from Zanesville and Cambridge when smallpox was prevalent in those cities. The cases were properly quarantined and isolated, but exposures had been allowed to go free. It is probable that almost all of the miners in the Forsythe Mine have been exposed, and on March 12th, two miners were taken sick and left their work.

A meeting of the township trustees was called and they were advised:

1. To employ a physician conversant with smallpox to investigate all suspicious cases and to vaccinate exposures.

2. To consider all miners in the Forsythe Mine as exposures, and to vaccinate each one, first dealing with those who worked in the immediate vicinity of the cases of smallpox, and later dealing with all others. Exposures in other mines nearby were to be sought, and vaccinated when

found. When vaccination was refused a strict quarantine should be at once instituted.

3. To provide for gratuitous vaccination, and to co-operate with the board of education in requiring the recent and successful vaccination of all school children before their admission to school.

4. To institute quarantine, where necessary, with decision and to prosecute any persons or person who violated the rules of quarantine.

5. To secure from the superintendent of the Forsythe Mines a list of all of the miners living in Center and other townships and to transmit this list to other township trustees, so that exposures living in townships other than Center Towship would not escape vaccination.

Neighboring township health officers were seen and advised as to the necessity of being on their guard, and taking proper precautions against the advent of smallpox.

SMALLPOX AT THE STATE SCHOOL FOR DEAF AND DUMB.

On November 26th, in compliance with the request of the superintendent, the epidemiologist visited the Ohio State School for the Deaf and Dumb to investigate an outbreak of smallpox.

His report follows:

There are fourteen cases of mild smallpox in this institution at present. These have occurred in children who escaped vaccination. Nearly all children have been vaccinated recently and successfully and those who have escaped are being vaccinated as rapidly as possible. A recommendation has been made in the Ohio State Board of Administration that an absolute rule be enforced in all state institutions requiring vaccination of all new arrivals and of all persons in the institutions who have not been recently vaccinated. It is not probable that the outbreak will extend much further.

SMALLPOX IN DEERFIELD TOWNSHIP, WARREN COUNTY.

On November 25, 1913, in compliance with the request of a physician, the epidemiologist visited King's Mill, in Deerfield Township, Warren County, to investigate an outbreak of smallpox.

His report follows:

King's Mill is a non-incorporated community, about thirty miles distant from Cincinnati on the Cincinnati division of the Pennsylvania Railroad. The working members of the population are employed for the most part in the large mill from which the community takes its name.

There are two cases of smallpox at present in King's Mill. The cases are discrete, both in the pustular stage, and the character and distribution of the lesions are typical. A characteristic history of prodromata was elicited. In the first family in which the disease developed, the head of the family visited his parents in Kentucky toward the end of October. Fourteen days later he developed headache, pains in the limbs and back and prostration. In a few days an eruption developed and he no longer felt sick. During the whole course of the eruption he worked at King's Mill. His wife, one of the cases mentioned above, contracted the disease from him. The fact that he had been vaccinated seven years ago probably explains the mild character of the symptoms. On examination he presented practically no signs of the eruption.

The health officer was informed that the cases were smallpox, and both were quarantined. He was instructed to locate, quarantine and vaccinate all exposures, and other directions concerning quarantine were given.

The men employed in the same department of the mill as the mild case previously mentioned, are exposures and should be vaccinated and quarantined. One of the heads of departments was informed that much trouble might be saved and losses avoided by vaccinating all the employes.

SMALLPOX AT DELAWARE.

On September 16, 1913, in compliance with the request of the health officer, the epidemiologist visited a case of eruptive disease in which the diagnosis was not clear.

His report follows:

The patient, a married woman of thirty years of age, was taken sick on September 6th. Her symptoms consisted of feverishness, a slight headache, and aching sensation in the extremities. On the 7th instant an eruption appeared which extended from the forehead downwards over the whole body. The patient had come in contact with several children who were said to have had chickenpox and who showed the remains of lesions on their bodies which indicated that this was the case.

On the date of investigation, the face, extremities and body of the patient showed numerous lesions, some resembling tubercles, others dark reddish stains, and still others vesicles. The history and appearance of this patient were both extremely atypical and while a tentative diagnosis of chickenpox was made, the health officer was advised to watch the case closely to see if any further and more significant signs developed.

SMALLPOX ALONG THE LINES OF THE DETROIT, TOLEDO AND IRONTON RAILROAD.

On June 24th and 25th, in compliance with the request of the chief surgeon of the Detroit, Toledo and Ironton Railroad, the epidemiologist investigated an outbreak of smallpox along the lines of this railroad.

His report follows:

In April a gang of men engaged in bridge work were quarantined for smallpox at Delray, Michigan. They had been exposed to a member of the gang who had smallpox but escaped quarantine before this quarantine took place. This individual left at least one case of smallpox in every place he visited. His brother in Harrison Township, Henry County, was taken down with smallpox two weeks after a visit had been paid him. Members of a household at which he boarded in Napoleon were later seized with smallpox and other members of the gang in which he worked fell victims to smallpox at Delray, Michigan, and Ottawa, Ohio. At the present time some of the members of this gang are quarantined for smallpox in a box car near Ottawa. One case of smallpox exists, and two other members have the prodromal symptoms. The other members of the gang have been vaccinated. Altogether nine cases of smallpox are traceable to this individual who has now completely recovered. The health officer at Ottawa had taken every precaution, even to the extent of placing in quarantine the foreman who had been discharged from quarantine at Delray. This was a wise step as the lesions were not yet innocuous. A case at Quincy, previously investigated, was also due to this individual. All railroad men exposed in any manner to this individual have been vaccinated and are being observed frequently. Three houses in Napoleon are quarantined for exposure and the inmates have been vaccinated. The health officer at Napoleon did not take the necessary steps when he learned smallpox existed and further did not appear to understand the prevention of smallpox so that the mayor was advised to appoint some physician conversant with the disease to take charge of the situation. He appointed Dr. C. M. Harrison, who is also local surgeon to the Detroit, Toledo andl Ironton Railroad. The trustees of Harrison Township were notified of the presence of a case of smallpox and were given instructions to prevent its spread. They were also advised to appoint a physician to carry out preventive measures.

This investigation emphasizes the fact that a health officer should be appointed only because he has fitted himself for the position.

Under the present management, measures to restrict the spread of smallpox will be carefully carried out and no further trouble is anticipated.

SMALLPOX IN FRANKLIN TOWNSHIP, FRANKLIN COUNTY.

On December 29th, in compliance with the request of a physician, the epidemiologist visited Franklin Township, Franklin County, to investigate a case of eruptive disease.

His report follows:

Franklin Township adjoins the outskirts of Columbus and is reached by an electric railroad. The patient, a female aged 35, works in the Capital City Laundry of Columbus. She took sick about twelve days ago, and is now in the eighth day of eruption. The lesions are pustular, umbilicated, and distributed most plentifully on the face, wrists, back and extensor surface of the legs. Pustules are also present on the palms of the hands and soles of the feet. The disease is discrete smallpox. A history of exposure at her place of work was given. The health officer of Columbus was notified and he found several cases of smallpox there and evidences of past infection.

The usual instructions were given to the township board of health and no further cases resulted outside of this family.

SMALLPOX AT GLOUSTER.

On June 7. 1913, the epidemiologist visited Glouster to investigate the truth of a number of complaints received concerning the quarantine regulations enforced against smallpox.

His report follows:

Glouster is a village of approximately 2,500 inhabitants and is situated in Athens County on the Kanawha & Michigan Railroad lines. Seven cases of smallpox were found there in March by a special inspector of the State Board of Health, and some of these cases had been diagnosed as chickenpox by the attending physicians. The local board of health was advised to quarantine all cases and to vaccinate or quarantine all exposures, which was done. They were also advised to enforce vaccination of school children which they negleted to do, stating that in their opinion the best plan would be to await developments. This plan, if generally carried out, would nullify all preventive measures. However, only a few more cases developed and on June 7th, the date of investigation, the last case had been dismissed. The physicians in the village report no cases of smallpox, chickenpox or other eruptive diseases. Some of the former cases of smallpox were in minors. Several cases had developed in Trimble Township outside of the corporate limits of Glouster. There are no known cases of eruptive disease in Trimble Township at present.

In March, during the outbreak of smallpox, the former health officer was removed from office and the fire marshal appointed in his stead. The reasons for this step were not made plain. There remains the possibility that smallpox may lie hidden during the summer months and break out in the autumn. The health officer and trustees of Trimble Township were advised to enforce vaccination of school children as soon as possible.

Should smallpox again develop in Glouster and the authorities attempt to deal with it by the same dilatory methods as were employed previously, it is recommended that a physician be appointed by the State Board of Health to take charge of the situation.

SMALLPOX IN GREENE TOWNSHIP, WAYNE COUNTY.

On February 12, 1913, in compliance with the request of the health officer, the epidemiologist visited Green Township, Wayne County, to investigate an alleged case of smallpox.

His report follows:

The patient is a male, aged 40, white. On February 5th, he became prostrated and suffered intense backache and frontal headache. These symptoms lasted for two days. At the end of the third day an eruption appeared, first macular in character, presently passing through the stages of papule, vesicle and pustule. At the time of examination the eruption consisted of crusts. There was also an acneiform eruption present which rendered the diagnosis difficult. The diagnosis of smallpox made by the attending physician was, however, confirmed by the preponderance of evidence.

The patient had been working at Rittman, and knew of no other cases of smallpox or sickness there, nor could any history of exposure be elicited. Many exposures had occurred among the patient's neighbors, and the health officer was requested to see that all were vaccinated and quarantined. He was advised to see that the school children were vaccinated by co-operating with the board of education. No other families developed the disease.

SMALLPOX IN GREENFIELD.

On June 9, 1913, in compliance with the request of the health officer, the epidemiologist visited Greenfield to investigate a case of an eruptive disease.

His report follows:

C. M., female, aged 51, was seized with fever, backache, headache, and prostration on the morning of May 29th. On May 31st, an eruption appeared which soon faded away and another appeared on June 2nd. The latter eruption rapidly became pustular so that on the 9th instant the eruption consisted of large deeply placed pustules most abundant on the face and extremities and scanty on the chest. The eruption was present in the pharynx and on the soles of the feet and palms of the hands. The patient had chickenpox in her youth but had never been vaccinated. A diagnosis of smallpox was made and it was attempted to ascertain the source of infection but without success. The only possible way by which this disease might have been contracted was at a motion picture show. The health officer stated that no other cases of smallpox or chickenpox were known to exist in the village. Two children outside the village, however, had chickenpox two weeks previously but from the description of this disease and its course it is probable that no mistake had been made in the diagnosis. Both children were convalescent and there remained no signs of the eruption. Neither gave a history of a previous attack of chickenpox. There were five other members of the family and only two had been vaccinated by the accepted method. The others had been treated by the *internal homeopathic* method. There was a number of exposures who had not been quarantined or vaccinated. The health officer was instructed to vaccinate or quarantine all exposures; he was also informed that the State Board of Health would not accept the so-called internal method of vaccination and that all exposures so treated must be vaccinated by the usual method or strictly quarantined. He was also instructed to be on the watch for cases of eruptive disease in and around Greenfield and to investigate any cases of chickenpox reported.

SMALLPOX IN LIBERTY TOWNSHIP, DELAWARE COUNTY.

On June 20th the epidemiologist was sent to Liberty Township, Delaware County to investigate an outbreak of smallpox.

His report follows:

There have been quite a number of cases of eruptive disease in Powell during the last few months. The local physicians have pronounced these cases chickenpox, although some adults suffered from the disease, and some have given histories of previous attacks of chickenpox. On June 19th, an inspector of the State Board of Health examined one of these cases and pronounced it smallpox. The local board of health failed to secure reports of these cases, although chickenpox is a reportable disease, and had not appointed a health officer since the resignation of the former health officer. The board of health was instructed to appoint a health officer immediately and to investigate all cases of suspicious nature, to vaccinate all exposed and to enforce quarantine. An infant was examined and found to have smallpox and the father and mother showed signs and gave a history of having passed through an attack of smallpox recently at Hyatts. It is very probable that a large number of cases of smallpox have been allowed to expose many people, because their true nature has not been recognized.

The local board of health appointed a health officer in the person of a physician at a compensation of $10 a day to carry out the preventive measures necessary in smallpox.

SMALLPOX AT LONDON.

On February 28th, in compliance with the request of the health officer of London and the medical society of Madison County, the epidemiologist visited London to investigate two cases of an eruptive disease and to address the county medical society.

His report follows:

The individuals who were exposed to smallpox which prevailed among the members of a section gang, (mentioned in a previous report) were seized with symptoms of prostration, intense headache and backache, and vomiting. A diagnosis of smallpox was made by the attending physician when the eruption appeared four days later, and this diagnosis was confirmed.

The members of the medical society discussed the prevalence of a mild form of smallpox and commented upon the fact that severe cases were contracted from this mild form of the disease.

Quarantine and vaccination are being properly enforced at London. School children, however, are not being vaccinated and it was recommended that the health officer should urge upon the board of education the necessity of this step.

On July 18th, in compliance with the request of a citizen, the epidemiologist visited London to investigate the report that smallpox prevailed there and that the health officer had left town without leaving anyone in charge of the situation.

The report follows:

Three cases of smallpox which were not quarantined were found. Two were convalescing but one was still sick. A number of families who had smallpox were also visited and were found to be in a proper condition to discharge.

The health officer had left town and placed a physician in charge of the situation but had left no specific instructions and the physician was not conversant with the proper measure for the prevention of smallpox. He was given instructions and literature and the mayor was advised to announce in the newspapers that in the absence of the health officer this physician would have full charge of the situation and that all cases of contagious disease must be promptly reported to him. This was done. No further spread of the disease occurred.

SMALLPOX AT MOUNT VICTORY.

On July 13th, in compliance with the request of the health officer, the epidemiologist visited Mt. Victory to investigate a supposed case of smallpox.

His report follows:

On July 2nd, a male 19 years of age, was seized with backache, headache and prostration. These symptoms were severe enough to confine him to his bed. On July 6th, an eruption appeared and the physician in attendance, who is also the health officer, made a diagnosis of smallpox. Because there were no cases of smallpox in the vicinity many persons thought that this case could not be smallpox and caused the health officer considerable trouble. His diagnosis, however, was confirmed. All those who were known to be exposed had been vaccinated or quarantined. Should any of the exposures have escaped a further development of the disease may be expected about July 20th.

The health officer was instructed to be on the look out for any cases. The infection in this case was probably derived from Powell, Ohio.

SMALLPOX AT MARION.

On September 6th, in compliance with the request of the health officer, the epidemiologist visited Marion to investigate an outbreak of smallpox.

His report follows:

Marion is a city with a population of 18,232 situated in Marion County. A case of smallpox developed there in February but no outbreak occurred until August. At present there are ten cases of the disease in five families, and no case has recently been dismissed.

As a question had been raised as to the diagnosis, ten of the patients were visited and the diagnosis confirmed in each case. The disease was severe enough in all of the cases to place the diagnosis beyond doubt.

The health officer was appointed by the board of health to take charge of the patients at a compensation of $15 per day. His bill for services rendered was held up by the council after it had been properly certified by the board of health, on the ground that proper attention had not been paid to some of the patients, and in one instance an affidavit was filed stating that the health officer had never entered the house.

This investigation revealed that each case had been properly attended. During the warm weather some of the patients sat outside of the house, and it was not necessary for the attending physician to enter.

A meeting of the board of health was called and they were advised to secure a quarantine hospital and to enforce the vaccination of all school children. Some of the cases were in children and the source had not been discovered, so that the importance of these steps recommended to the board is obvious. No action was taken by the board in regard to these matters.

A very painstaking effort should be made to discover and vaccinate or quarantine all contacts, and the vaccination of all school children should be insisted upon. Should great care not be exercised the spread of the disease is probable.

SMALLPOX AT MOXAHALA, PLEASANT TOWNSHIP, PERRY COUNTY.

On May 23, 1913, in compliance with the request of Dr. W. F. Stoneburner, the epidemiologist visited Moxahala to investigate some cases of an eruptive disease.

His report follows:

Moxahala is a settlement of about five hundred persons in Pleasant Township, Perry County. It is situated on the T. & O. C. R. R. lines and is thus brought into communication with different points on the M. C. & C. R. R. in Washington County, where smallpox has been prevalent. In addition a mining settlement about one mile distant from Moxahala is the source of considerable passenger traffic between this and other mining towns and the transfer of infectious and contagious diseases is in this maner facilitated.

On or about May 9th, a white male aged 40, took sick with headache, backache and general malaise and prostration; he was also very "feverish". Four days later an eruption appeared on his face, wrists, back and etremities. This eruption progressed through macular, papular and vesicular stages and then aborted. On examination the patient was found to have a number of small brownish stains on his face, wrists and back with a few on the chest and legs. His palms and soles also showed a number of these stains. He gave a history of having had chickenpox in his youth and had never been vaccinated. Two other adult members of the family were also examined. One complained of severe headache, backache and weakness which forced him to take to bed on May 18th. At the present time he has a papular eruption most plentiful on the face and forehead but also present on the back and extremities. The lesions progressed from small to hard shotty and larger papules in several hours. The other member of the family is at present complaining of severe headache and backache but no eruption is as yet visible. In another family there have been three cases of a similar eruptive disease; two children, three and five years of age respectively, have recovered and show only a few scattered brownish stains. A third, a girl of nine, with a history of having had chickenpox recently, shows a pustular umbilicated eruption with the distribution usual in smallpox. She has never been vaccinated. Two adults who were vaccinated some years ago, escaped. In a family at the mining settlement surrounding the Perry County Coal Company's mine there have been three cases of an eruptive disease. Two have recovered and show no signs of their illness but the third, a boy aged 9, is covered with an eruption resembling smallpox in the crust stage. The lesions are most plentiful on the face, back and extremities and the distribution is symmetrical. The patient has never been vaccinated. The history of his prodromal symptoms is inconclusive but indicates a greater severity than would be expected in chickenpox. Two adult members of the family who were vaccinated several years ago have so far escaped.

The diagnosis of smallpox was made in the first cases mentioned. In the last cases a tentative diagnosis of smallpox was also made and the phyicians requested to vaccinate the patients to determine the nature of their illness.

There have been no known cases of smallpox among the miners and a definite history of exposure is lacking but some of the cases have been in neighborhoods where this disease prevails.

It was recommended to the health officer and a member of the board of health that they employ a physician to investigate all suspected cases, if any arose, to quarantine and vaccinate all exposures and to keep a close watch on all miners for the appearance of any eruptive disease. It was also recommended that the board of health vaccinate all exposures at the expense of the township. If all known cases are strictly quarantined and all exposures vaccinated or quarantined, it will not become necessary to prohibit public gatherings.

SMALLPOX AND CHICKENPOX IN NEWTON TOWNSHIP, MUSKINGUM COUNTY.

On January 19, 1913, upon request of the health officer, the epidemiologist visited Newton Township, Muskingum County, to investigate an outbreak of smallpox and chickenpox.

The report follows:

In this investigation it was found that one family was quarantined for smallpox and that there were seven cases of chickenpox in which quarantine was not practised. The cases were visited and the diagnosis of chickenpox confirmed. The patients in the family quarantined for smallpox were examined. There was a history of numerous visits to Zanesville during the probable period of incubation. According to the history prodromal symptoms had not been marked. The four patients were practically convalescent and careful examination failed to reveal typical lesions of smallpox. Because of the fact that two physicians had seen these cases and that at the time of investigation the lesions had passed the easily recognizable stage, the diagnosis of smallpox was not disputed and the family was instructed to carry out the wishes of the health officer in regard to quarantine and release. It was recommended that the school which had been closed could be reopened. The outbreak dated from the beginning of December. Vccination was urged in this community because of its proximity to Zanesville, and because of the fact that many persons traveled to and from Zanesville frequently.

There was no further extension of the disease.

SMALLPOX ON THE LINES OF THE OHIO ELECTRIC RAILWAY.

On February 13 and 14, 1913, in compliance with a number of requests, the epidemiologist visited Springfield, Summerford, London and Lafayette to investigate the alleged presence of smallpox in these localities.

His report follows:

A case of smallpox at Springfield, and one each at London and Columbus, which could not be traced to exposure elsewhere than between these points, first directed attention to the possibility of such exposure having taken place along the line of the Ohio Electric Railway. The case now quarantined for smallpox at Columbus travelled over these lines during the early part of his illness and exposed many persons. This patient was a motorman on a work train at or near London. The conductor on this train was immediately looked up and vaccinated but probably many other exposures were allowed to escape.

The case at London was taken sick on February 5th, with the characteristic prostration and intense backache, and headache. Four days later he developed an eruption and the disease was shortly afterward pronounced smallpox by the attending physician. There were only a few exposures and these were promptly vaccinated. This man was a member of a section gang employed by the Ohio Electric Railway near Summerford. The other men in this gang are being attended to by the health officer at Summerford and at other places where they reside.

There are at present two cases of smallpox at Lafayette, both in adult males, the onset of the first case dating back to February 4th, the second to February 7th. The lesions in each case were typical and corresponded in appearance to the day of the disease as elicited by the history. One of these patients had been employed by the Ohio Electric Railway as member of an extra gang, which disbanded on the appearance of the disease. The other patient was employed by the same company in an extra gang working near Summerford. Two of the members of this gang were quarantined at Summerford at the time of the investigation, and two others were immediately warned to be vaccinated, or be subject to quarantine at Lafayette.

Thus a case of smallpox appeared in each of three gangs within a week,—two extra or floating gangs, and the section gang on section number three. These men mixed considerably with each other and were accustomed to use the passengar cars of the Ohio Electric Railway to go to and from their homes. In addition a motorman employed on a work train used by these men developed smallpox at about the same time.

In Summerford the health officer of the township was advised to vaccinate the exposures he had quarantined and release them on the condition that they call at his office daily for observation. He was further requested to deal with the men employed on the section in the same way. This he promised to do. Further, it was advised that the board of education of the township be requested to make the entrance of children to school conditional upon recent and successful vaccination.

At London practically no exposures had taken place, and those who had come in contact with the case of smallpox even prior to the eruption were vaccinated. A list of the names and addresses of the men who were members of the gang working near London in which a case of smallpox had developed was given to the health officer and he immediately instituted a quarantine of observation.

At Lafayette exposures had been numerous as there had been a difference of opinion concerning the diagnosis. The school had been closed and the two families in which cases existed quarantined but no further steps had been taken. The health officer was instructed to quarantine or vaccinate all exposures immediately and to give notice that this would be done. The board of education was requested to adopt a regulation forbidding the admission to school of those who had not been recently and successfully vaccinated. They expressed themselves as in favor of this measure. Literature on smallpox and the efficacy of vaccination as a prophylactic was distributed.

Because of the fact that the cases of smallpox had taken place among employees of the Ohio Electric Railway, that these cases had used the passenger cars belonging to this company, and that the disease was spreading along the lines of this company, the company was urged to see that all their employees between Zanesville and Springfield were vaccinated, and the cars disinfected according to directions which were furnished them by the health officer of Springfield. Representatives of the company promised to see that both these measures were carried out.

The fact that many of the employees of this company are going to and from Zanesville where smallpox has been prevalent must also be taken into consideration, and it is possible that the first exposure took place there.

SMALLPOX AT PITSBURG.

On July 29, 1913, in compliance with the request of the health officer, the epidemiologist investigated a suspected case of smallpox at Pitsburg, Ohio.

His report follows:

Pitsburg is an incorporated village with a population of approximately 250, situated in Darke County. No cases of smallpox have existed in the village for several years. On July 4th an adult male visited Brookville. On the 16th instant he began to complain of headache, backache, and had chills and vomiting. His temperature was high. On the 20th instant an eruption appeared, and on the 21st the attending physician, who is also the health officer, made a diagnosis of smallpox. The patient admitted that he had chickenpox in his youth, and stated that he had never been vaccinated. On the 29th instant he was examined by the epidemiologist, and the diagnosis of smallpox was confirmed.

All exposures have been vaccinated, and late exposures were quarantined. One individual after being vaccinated left for Troy and the health officer of that city was advised of the fact. One or two cases of smallpox may occur among exposures but further spread is not anticipated.

SMALLPOX IN PLEASANT AND HARMONY TOWNSHIPS, AND VIENNA, CLARKE COUNTY.

On March 7th, in compliance with a number of requests, the epidemiologist visited Vienna, and Harmony and Pleasant townships, Clarke County, to investigate some cases of supposed smallpox.

His report follows:

On February 23rd, the postmaster of Vienna was seized with violent backache and headache, and some prostration. Four days later an eruption appeared. On investigation this eruption was found to have reached the pustular stage, and the distribution and appearance were characteristic of a mild case of discrete smallpox. During the two weeks previous to his illness he had come in contact with a number of men working on the Ohio Electric Railway and had traveled on their cars.

In Pleasant Township two cases were investigated, and found to be smallpox. These cases were in an adult male and female, and the eruption was more diffuse and the disease more severe than in the case mentioned above. In the female, the period of invasion was marked by transient delirium.

In Harmony Township an adult male was seized with the usual symptoms of invasion, and the physician at once quarantined the house, although the diagnosis was not yet clear.

The authorities in the localities where these cases occurred were instructed to vaccinate or quarantine all exposures immediately. They were advised to require the vaccination of all school children and that only those with a certificate of recent and successful vaccination should be admitted to school. They were also instructed to quarantine all cases on suspicion, and to see that physicians carried out their wishes in this respect. There is no health officer in Harmony Township, but one is to be appointed immediately.

SMALLPOX AT POMEROY AND SYRACUSE.

On October 18th, in compliance with the request of the health officer, the epidemiologist visited Pomeroy and Syracuse to investigate an outbreak of eruptive disease.

His report follows:

Pomeroy is an incorporated village with an estimated population of 4500. Syracuse is not incorporated but has a population of three or four hundred. These communities are both situated along the Ohio River in Meigs County.

Twenty-one years ago a number of cases of eruptive disease appeared which were thought to be chickenpox and no change in the diagnosis was made until six or seven of the cases had died. The present outbreak dates from the beginning of September. There are four cases of the disease in Pomeroy and two in Syracuse. All present the same symptoms and the history in each case is characteristic.

A diagnosis of discrete smallpox was made in each case. The health officer of Pomeroy was advised to secure the vaccination of all school children. He was informed that all exposures must be vaccinated or quarantined and the quarantine and isolation of cases was explained to him. The health officer of Sutton Township, who is, therefore, health officer of Syracuse, was advised to vaccinate the school children in his community and was given all information relative to the quarantine and prevention of smallpox.

It is quite probable that a number of other cases of smallpox will develop in these communities because of the length of time these patients have been allowed to expose other people.

SMALLPOX AT QUINCY.

On June 19, 1913, in compliance with the request of the health officer, the epidemiologist visited Quincy to investigate a case of suspected smallpox.

His report follows:

The patient is a male, age 25, married. He was employed as a telegraph operator in the yards of the Detroit, Toledo & Ironton Railroad at Napoleon. He has never had chickenpox, nor has he ever been vaccinated. On June 10th he was seized with severe frontal headache, prostration and aching sensation in the limbs, severe enough to cause him to stop work for two days. On the 14th instant an eruption appeared on his face and forehead, on the 15th instant he was examined by a surgeon of the Detroit, Toledo & Ironton Railroad, who made a diagnosis of smallpox and sent the patient to his home in Quincy. He was examined again by two physicians on the 16th instant and one of them made a diagnosis of chickenpox, the other smallpox. On the 19th instant examination revealed the following:

An eruption, resembling smallpox in the "crust" stage, is present on the face, extremities, soles of the feet and palms of the hands. The eruption is scanty on the face and abdomen and plentiful on the back.

A diagnosis could only be arrived at by exclusion, as the eruption at the time of the examination was not characteristic. The presumptive evidence, however, was strongly in favor of smallpox and the health officer was instructed to treat the case as one of smallpox. He was further instructed to vaccinate all other members of the family and to vaccinate or quarantine all others exposed. There have been very few exposed to this patient during the stage of his illness when the most danger existed and there are no other cases of eruptive disease in Quincy.

SMALLPOX AT RICHWOOD.

On October 2nd, in compliance with the request of a physician, the epidemiologist visited Richwood to investigate an outbreak of smallpox.

His report follows:

Richwood is a village with a population of approximately 1800 inhabitants, situated in Union County. Three active cases of smallpox were found, and it was also found that wholesale exposure had taken place in school. The cases were quarantined, exposures in the families affected with smallpox vaccinated, and a number of families supposed to have smallpox were visited.

A meeting with the board of health was held and they were instructed to place a competent physician in charge of the situation, inasmuch as the health officer was unable to perform the work. They were also advised to act in conjunction with the board of education in adopting a regulation requiring recent and successful vaccination as a prerequisite to admission to school. This was done. The usual precautionary measures practiced in smallpox outbreaks were discussed, and the board of health showed a disposition to take prompt and stringent action. As a result of this only one more case of smallpox developed.

SMALLPOX IN ROME AND BERNE TOWNSHIPS, ATHENS COUNTY, AND DECATUR TOWNSHIP, WASHINGTON COUNTY

On March 15th, in compliance with a number of requests, the epidemiologist visited Rome and Berne townships, Athens County, and Decatur Township, Washington County, to investigate an outbreak of smallpox.

His report follows:

In a previous report the results of an investigation of smallpox in the townships mentioned above were given. A new case has developed in Decatur Township, and two new cases in each of the townships, Berne and Rome. In Decatur Township the case was quarantined promptly but no effort was made to ascertain the number of exposures. The president of the township trustees was, therefore, instructed that immediate steps must be taken regarding exposures, either vaccination or quarantine for a period of seventeen days from the date of exposure being compulsory. His attention was directed to the previous recommendations made, that a physician be appointed to investigate all suspicious cases of eruptive disease and to vaccinate all exposures. The necessity for prompt action was urged upon him, and his attention was called to the fact that the State Board of Health has the power to take the necessary steps and incur needful expenses where the local authorities fail or refuse to act. The physician appointed by the board of trustees was instructed in the law regarding smallpox and the regulations of the State Board of Health.

In Berne Township, at Broadwell, a small non-incorporated community, two cases of smallpox developed and both are convalescent at the present time. There were a large number of exposures, and nearly all have been vaccinated. A list of the exposures from other townships is being compiled and will be sent to the trustees in the townships where such exposures reside. A physician has charge of the cases and exposures at Broadwell.

In Rome Township there were only a small number of exposures from the two cases, and all were promptly vaccinated. Representatives of the boards of health in Berne and Rome townships were instructed that there should be no hesitation in dealing with exposures and suspicious cases of eruptive disease. A case of smallpox in Broadwell was examined, and showed typical signs and symptoms of the disease.

Because of the mildness of the disease in many cases many individuals are misled, and the boards of health encounter a great deal of opposition. Because of this a number of pamphlets were distributed dealing with the present mild outbreak of smallpox.

It may become necessary in Decatur Township to appoint a physician to investigate and quarantine cases of smallpox and exposures.

SMALLPOX IN RUSH TOWNSHIP, CHAMPAIGN COUNTY.

On May 24, 1913, in compliance with the request of a member of the local board of health and a physician, the epidemiologist visited Rush Township to investigate an alleged outbreak of smallpox.

His report follows:.

An adult male aged 30 showing a pustular eruption was examined. He gave a history of the usual prodromal symptoms four days before the onset of his eruption. The lesions were pustular, deeply placed, and some umbilication present. He had had an attack of chickenpox in his youth and had never been vaccinated. His wife, who was vaccinated ten years previously, was not attacked but two children have had an illness resembling their father's illness. The house was quarantined for smallpox. The families of two neighbors had been exposed and both gave histories of having had the same disease although a diagnosis of chickenpox was made. There was no evidence at the time of the investigation that they had smallpox although the history of the previous attack of chickenpox and no vaccination, coupled with the fact that smallpox was prevalent in the neighborhood, was considered strong presumptive evidence in favor of smallpox.

The health officer and the president of the local board of health were instructed to quarantine or vaccinate the exposures and to disinfect the house when the patient recovered. They were also instructed to investigate every case of a suspected nature and to endeavor to trace all exposures and vaccinate them when possible. They were warned to enforce quarantine strictly and if necessary to appoint guards or bring any offenders before a justice of the peace. They were also informed that inasmuch as laxity had existed in enforcing preventive measures it would become necessary to appoint some physician to take charge of the situation at the expense of the township if the local authorities failed to do all in their power to restrict and prevent the spread of smallpox.

TRACHOMA AT EAST YOUNGSTOWN.

On November 12th and 13th, the chief of the Survey of Occupational Diseases and the epidemiologist, made an investigation of an outbreak of trachoma at East Youngstown.

Their report follows:

East Youngstown is an incorporated village with an estimated population of nine thousand. It is connected with the city of Youngstown by means of the street railway. A large majority of the laboring classes are in the employ of the Youngstown Sheet and Tube Company, a corporation employing seven thousand hands. The health officer of the village serves in lieu of a board of health. The population is largely composed of recent immigrants and numbers Roumanians, Slavs, Croatians, Magyars, and a sprinkling of other races. The sanitary conditions are sadly in need of attention. Many of the immigrants are unmarried and herd together like sheep, in small houses, as many as thirty to a six roomed house in some instances. There are no sanitary sewers and no public water supply. Wells are numerous and almost invariably in danger of contamination from nearby and insanitary privies and cesspools.

It is among this class of people that trachoma spreads most rapidly and the population of East Youngstown presents no exception to the rule. It is probable that this disease has been endemic in the village for years. One case of several years duration was found and there probably existed many others.

The cases of trachoma of which record was available developed in 1913 as follows:

Name.	*First Complained*
John Otzela	April 9, 1913.
Joe Coza	April 22, 1913.
Joe Febosher	April 27, 1913.
Nick Deock	May 16, 1913.
Chas. Dobre	June 30, 1913.
Sam Rewon	July 23, 1913.
Merko Trestor	July 25, 1913.
Morris Washell	August 5, 1913.
Gabriel Popp	August 7, 1913.
George Argo	August 8, 1913.
John Purca	August 7, 1913.
Todor Eusor	August 11, 1913.
Eno Duko	August 18, 1913.
Nick Strour	August 21, 1913.
Eftua Mender	August 25, 1913.
John Pierca	September 2, 1913.
Martin Simbokitz	August 31, 1913.
Frank Sallow	September 4, 1913.
John Loza	September 8, 1913.
Joe Waldor	September 22, 1913.
John Marian	September 16, 1913.
Joseph Waldo	September 22, 1913.
Joe Hollogh	November 1, 1913.
George Morri	November 4, 1913.
Paul Harper	November 8, 1913.

An inspection of the plant in which all these men, with one exception, were employed revealed few possible sources of infection. There are no common roller towls, practically no toilet facilities, (wash-bowls, and conveniences for washing the hands and face), with the exception of flush closets and urinals, and few other opportunities for transmitting the secretions of the eyes from one person to another. It would be impossible to say, that some of these cases did not contract the disease at their work. On the other hand it was found that the boarding houses in which the majority of these men eat and sleep, present ideal conditions for the transmission of trachoma, and other diseases spread by personal contact. Peculiar difficulties developed when it was attempted to find the residence of each case of trachoma. The men do not speak the English language, do not know the street and number of their boarding places, and regard an investigation of these particulars with suspicion. The only manner in which it is possible to find the residence is to follow each person from the plant to his home, and even if this is done the individual is just as liable to lead one to another house as to his own residence.

As the patients complained to the hospital department of the plant in which they were employed, they were referred to an ophthalmologist who treated them efficiently, but largely on a charity basis. Through his advice and with his assistance printed placards were distributed throughout the plant by the management. These placards contained instructions on the avoidance and prevention of trachoma, in the six principal languages. No hope of cure was held out, however, and this should be a vital part of such a placard. The patients were also verbally instructed by the physicians who conversed with them through an interpreter.

The health officer was advised of the existence of these cases of trachoma. He was instructed to visit the residence or boarding house of each patient and enforce the regulations of the State Board of Health regarding the use of common and roller towels. He was also advised of the steps necessary to place privies and cesspools in a sanitary condition, and his attention was called to the fact that cases of typhoid fever, which developed in East Youngstown and were cared for in Youngstown hospitals, were not being reported to him.

Certain additional steps are necessary to prevent the spread of trachoma in East Youngstown. They may be enumerated as follows:

1. Individuals with sore eyes and other symptoms of the onset of trachoma must be encouraged to seek expert medical attention.

2. If such cases prove to be trachoma, they should be instructed how to prevent spreading the disease, and such instructions should be also given to other persons living in the same building.

3. This advice and instruction should be followed up by occasional visits to the residences and by investigations of the sanitary conditions in such places.

4. A routine investigation of at least all boarding places should be made to detect cases which have not sought the advice of a physician.

These requirements can only be fulfilled,

1. By establishing a free dispensary for diseases of the eyes, and by holding out the hope of cure as a means of encouraging all persons with abnormal eye conditions to seek advice. A clinic of two or three hours once or twice a week would be sufficient.

2. By securing the services of an expert visiting nurse to follow up each case and see that other members of the family or others under the same roof are not infected.

Both of these requirements are vital. The patients have probably all contracted the disease since coming to this country. Precautions are now being taken to prevent the spread of the diseases in their place of employment. It follows that their homes are the points of attack.

The village of East Youngstown should, therefore, secure the services of an expert visiting nurse to supervise all cases and instruct them at their homes. It is also strongly recommended that a free eye clinic be established. It is possible that the Youngstown Sheet and Tube Company, through its Welfare Department, and other corporations employing residents of East Youngstown, might be interested in this project.

By carrying out these recommendations, not only will the spread of trachoma be restricted, but other insanitary conditions causing ill-health will be corrected.

Trachoma is a chronic disease with a tendency to exacerbation and remission and no spectacular and immediate results should be expected. The disease can, however, be prevented. It is the duty of the health officer to engage himself actively in this campaign by co-operating with the visiting nurse and by enforcing sanitary regulations.

NOTE — An officer from the United States Public Health Service was sent to East Youngstown, and made a very thorough investigation. He found 76 cases of trachoma, 10 among school children. His findings and recommendations are similar to those given above, and are being carried out. A physician has also been appointed by the Youngstown Sheet and Tube Company to examine all applicants for work and to take charge of the physical supervision of the workmen.

On December 5, 1913, acting under the direction of the Secretary, the epidemiologist made an investigation at East Youngstown, to determine whether the campaign against the spread of trachoma was proceeding satisfactorily.

His report follows:

A previous report on trachoma at East Youngstown outlined the methods and procedures necessary to prevent the spread of trachoma. The health officer had been instructed to locate all cases, if necessary with the help of a physician, and see that proper precautions to prevent the spread of trachoma were taken in all boarding houses, public meeting places and private homes. Following these directions, the health officer located ten cases which, in the opinion of the oculist, were still contagious. As all the patients were indigent they came under the care of the township trustees. Finding that it was impossible to locate the patients at home, they were placed in quarantine in a hall and guarded day and night for six days. The authorities were then advised by the Secretary of the State Board of Health that they should not quarantine cases of trachoma, inasmuch as the contagion might persist for years, and the disease could be controlled otherwise. The township trustees appointed a general practitioner to treat all cases. A federal officer was brought to East Youngstown to attempt to deport the cases but was unable to secure proper evidence.

The officers of the large plant in which a majority of the patients work, were consulted. It appears that when these cases develop, they are sent to an oculist and if trachoma is found, are discharged. They are not then re-employed by the plant until the oculist declares that all evidence of contagion is past. The oculist receives no compensation for this work, unless the disease was acquired in some manner for which the plant can be held responsible.

It seems more urgent than before, therefore, that a free clinic for the treatment of these cases should be established, and the services of a visiting nurse be secured. The local authorities are plainly unable to cope with the situation. In addition the schools should be inspected at least twice a year by a trained oculist to prevent the development of trachoma among the younger generation.

TUBERCULOSIS AT HILLIARDS.

On March 4, 1913, in compliance with a number of requests, the epidemiologist with a representative from the State School Commissioner's office, visited Hilliards to investigate a case of tuberculosis. The patient was the superintendent of the common and high schools and the school board wished to know whether there was danger of his transmitting the disease to the pupils.

The report follows:

The patient in question is a male, aged about 30. Height five feet, weight 140. There is a slight hectic flush on the malar eminences.

The respiratory movement is symmetrical but limited. Vocal fremitus is transmitted with greater intensity over the right apex and below the clavicle on the right side. A dull area can be outlined on percussion in the same situation. On auscultation there are numerous fine crepitant rales, over a large part of the right lung.

Specimens of sputum submitted to the Hygienic Laboratories in 1912 were found positive. Others have since been found negative.

It was recommended to members of the school board that all teaching with the exception of instruction in Botany in the open air be placed in the hands of assistants. The superintendent was to take charge only of organization. It was also recommended that the superintendent secure leave of absence for a short time to recuperate. The board of health concurred in these recommendations. In this way the superintendent will not come in contact with the pupils except in the open air and under exceptional circumstances. He is now in the care of a physician and is instructed in the care of his sputum and in the measures necessary to prevent infection of others.

TYPHOID FEVER IN ADENA.

On November 15th, in compliance with the request of a clergyman, the epidemiologist investigated an outbreak of typhoid fever at Adena.

His report follows:

Adena is an incorporated village in Jefferson County, having a population of 570. There are several coal mines in the vicinity, and a branch of the Wheeling & Lake Erie Railroad traverses the village.

Typhoid fever has always prevailed to a greater or lesser extent in and around Adena. At the present time there are nine cases, and there have been quite a number of others during the summer. In practically every instance there have been several secondary cases in the families which were attacked. In one family four cases occurred, one following the other at intervals of from three weeks to a month. Milk was sold to a neighbor, by one family in which there was a case of typhoid fever and two cases promptly developed in the neighbor's family.

Each family uses well water and dug wells only are found. A large tile sunk into the ground and covered with a wooden curbing is used to prevent surface contamination. The privies are of two types,—the common earth vault, in which the ground is sewage soaked, and the pail type, of which two were found. As Adena is built on sloping ground, it is customary for the privy above to contaminate the well below. No well was observed which was not surrounded by potential and probably actual sources of contamination.

The causes of typhoid fever in Adena are, briefly:

1. Insanitary privies,
2. Contaminated wells,
3. Contact, through carelessness in nursing,
4. Milk, in at least one instance,
5. Inefficient health officer.

The first step necessary to prevent the spread of typhoid fever in Adena is to secure an efficient health officer. Next, the present insanitary privies should be replaced by reasonably clean structures with water-tight vaults and a cleanout extension. (Ohio State Building Code, Part IV.) Wells should in all instances be rendered safe from surface contamination. Lastly, the families in which cases of typhoid fever occur, should be carefully instructed in the isolation and care of the sick, to prevent contact infection.

These measures cannot be taken at once, and in the meantime, the use of anti-typhoid vaccine should be urged by physicians and health officer. The toilet facilities at the school are not superior to those described above, and should be immediately remedied.

TYPHOID FEVER AT BARBERTON.

On July 8th, in compliance with the request of the health officer, the epidemiologist visited Barberton to investigate the sources of an outbreak of typhoid fever.

His report follows:

Barberton, a city with a population of 9,410, is situated in Summit County. The large majority of house holders use the public water supply. This supply was installed in 1903, after a number of test wells had been driven and approved by the State Board of Health. The collecting well was located by the Division of Engineering after water from the test well had been examined in the hygienic laboratories. No colon bacilli were detected in the examination, and the number of bacteria per c.c. was comparatively low. An emergency intake is situated at the plant of the American Sewer Pipe Company, and the health officer was instructed that this should be locked and the key kept in his custody.

An examination of the water supply in 1906 revealed the fact that the water could be contaminated in several ways. The board of trustees of public affairs was notified that certain changes must be made, so as to avoid surface contamination and the possible entrance of creek water into the public supply. In 1911 analyis of samples of water from the pumping station and two points on the distribution system, showed the water to be of excellent quality and suitable from a sanitary standpoint for public water supply purposes. It was found at this time that the health officer had not locked the valves connecting with the city water supply and the attention of the authorities was called to the matter.

To summarize, the public water supply of Barberton is of good quality, and if properly protected from contamination is quite satisfactory from the sanitary point of view.

THE PRESENT OUTBREAK.

Only two cases of typhoid fever were reported from Barberton in 1912. The present outbreak began on May 13th, and seven cases occurred between this time and the 30th of May. One case occurred in June.

1 case	May 13th.
1 case	May 14th.
1 case	May 19th.
1 case	May 20th.
1 case	May 25th.
1 case	May 28th.
1 case	May 30th.
1 case	June 28th.

The patients were children, with one exception.

1 case	10 months.
1 case	3 years.
2 cases	5 years.
1 case	6 years.
1 case	7 years.
1 case	8 years.
1 case	18 years.

They were widely scattered, four occurring in Barberton and five in Johnston's Corners, a settlement in Norton Township, one mile west of the city limits. Three cases occurred in one family and at least one of these was due to contact infection. There was no factor common to these cases except milk. All received their principal supply of milk from Mr. W., while two received other supplies occasionally. As all other sources can be eliminated, the evidence is convincing that milk spread the disease. The fact that all the patients used milk, were of an age when milk forms a large part of the diet, and all received the same supply previous to their illness, is proof of this. This supply was stopped about the 25th of May and the outbreak subsided; no further cases being reported.

HISTORY OF MILK SUPPLY.

The milk route now owned by Mr. W., has passed through various hands. In 1908 an epidemic of typhoid fever was traced to this route, twenty-seven cases occurring among the customers. A child in Norton Township, whose father supplied milk to this route was taken down with typhoid fever in December 1907. The epidemic occurred in February 1908. The wife of one of the owners of this route died of typhoid fever, date not known. Mr. W. secured the route early in 1912.

There are six dairies selling milk to Mr. W. Two of them sold milk to the owner of his route when the epidemic of typhoid fever occurred in 1908. One of these families had the case of typhoid fever previously mentioned. In the other family nine cases of typhoid fever occurred nineteen years ago. One month after they began supplying milk to this route in 1908, the epidemic occurred, and the present outbreak began two months after they began to sell milk to Mr. W.

The health officer submitted samples of water from the wells of all these supply houses. Examination in the hygienic laboratories revealed the following:

Sample 12619, Bacteria 2760, B. coli in 10 c.c.
Sample 12620, Bacteria 1220, B. coli in 1 and 10 c.c.
Sample 12621, Bacteria 180, B. coli in 1 and 10 c.c.
Sample 12622, Bacteria 70, B. coli in 1 and 10 c.c.
Sample 12623, Bacteria 140, B. coli in 10 c.c.
Sample 12624, Bacteria 2760, B. coli in 1 and 10 c.c.
Sample 12625, Bacteria 380, No acid colonies.
Sample 12626, Bacteria 1440, Negative 10 c.c.
Sample 12667, Bacteria 1000, B. coli in 10 c.c.
Sample 12668, Bacteria 1080, B. coli in 10 c.c.

One of the samples in which no B. coli were found is from the well of Mr. W., the other from the well of a supply house.

The health officer of Norton Township allowed Mr. W. to distribute milk secured from other sources than his usual supply houses. An investigation of the premises was made. The milk house in a concrete building at the rear of a house in which there is a patient recovering from typhoid fever. The privy is an ordinary unscreened outhouse over a dug vault. The contents reach above the ground. The privy is about fifty feet distant from the milk house which is also unscreened. Bottles of milk were placed in the milk house and flies were feeding on drops of the milk on the paper caps of the bottles.

Mr. W. distributes between 60 and 70 gallons of milk daily. The milk from all the supply houses is mixed together and no customer gets any special milk. There are no facilities for sterilizing the bottles or other vessels used for milk, although ordinary cleanliness is practiced. The patient with typhoid fever worked at a factory and took no part in the care of the milk. Each supply house was visited and the usual conditions found, that is, the milk and vessels were handled with only ordinary cleanliness. The contaminated wells were inspected and advice given with a view of getting rid of the sources of pollution.

The health officer was notified that unless Mr. W. screened the milk house, and sent his son away from home, his milk route must be discontinued until the alvine discharges of his son were found free of typhoid bacilli. He was further notified that until the wells of the supply houses were found free of pollution no milk could be sold. It was further advised that the alvine discharges of the members of the families of the two supply houses in which typhoid fever had previously existed, be examined for the typhoid bacillus. Until these discharges are found free of typhoid bacilli no milk should be sold from these dairies.

TYPHOID FEVER AT THE COLUMBUS STATE HOSPITAL.

On May 2, 1913, in compliance with the request of Dr. Gilliam, the epidemiologist investigated the sources of typhoid fever at the Columbus State Hospital.

His report follows:

No cases of typhoid fever had occurred at the State Hospital in 1913 until April 12th, when an employee was taken sick. Another case developed on the 15th instant, three on the 23rd, one on the 25th, and one on the 26th. Two of the cases died, one on April 27th, of perforation, and one on May 1st, following severe intestinal hemorrhages. These hemorrhages and perforation developed in what was supposed to be the first week's illness. The patients are insane and do not complain as do normal individuals of their illness, nor can a correct history be elicited. It is, therefore, very probable that in practically every case the onset of illness took place several days earlier than is recorded. It will be noticed that the employee, from whom a correct history would be expected, took sick on April 12th. Further, it is very unusual for intestinal hemorrhages and perforation to occur during the first week of typhoid fever.

The ages of the patients were as follows:

One was 22 years of age,
One was 23 years of age,
Three were 25 years of age,
One was 46 years of age,
One was 49 years of age.

During the flood in Columbus a large number of refugees were housed and cared for in the State Hospital. In spite of this the supply of food and milk was secured from the same sources, and no change was made in the routine of the kitchen. No new attendants or assistants had been employed in the kitchen for a period of months; neither had any change been made in the attendants in the wards in which these patients were placed. Seven patients came from four different wards in the hospital and one from an entirely separate cottage.

The only change occasioned by the heavy rainfall during the last week of March was that in the water supply. The rains flooded the engine room and one day's supply of water was pumped from a number of driven wells, the water from which had been used previously only for washing purposes. It appears that these wells are liable to surface contamination and as the sewers were not able to take care of the extra load occasioned by the heavy rainfall, the chances were favorable for surface contamination and leakage into these wells. This supply was used on the 26th of March.

The water supply commonly used by the State Hospital is drawn from deep driven wells placed beyond all possible sources of pollution and well encased. The surplus is pumped into a standpipe. This water has been examined several times and found to be of good quality and no further cases of typhoid fever have been attributed to this source in the past.

All milk used in the institution is drawn from one dairy which was investigated. There have never been any cases of typhoid fever at the dairy either among the attendants, assistants or the dairyman's family. Apart from the State Hospital, only one customer is supplied and no history of typhoid fever could be elicited from this family. The dairy is not a strictly modern one and modern methods do not obtain but the conditions are about as good as are usual.

Samples of the water from the wells used on March 26th were taken and examined in the hygienic laboratories. Both samples showed the presence of an excessively high number of bacteria per c. c. In one sample the colon bacillus was detected in dilutions of 1 and 10 c. c. No colon bacillus was found in the other specimen.

A sample of the milk from the dairy was also taken and on examination showed the presence of about the average number of bacteria per c. c. The colon bacillus was detected in 1-100 c. c. but this finding is only of relative significance, showing a certain amount of carelessness in handling the milk.

CONCLUSIONS.

It is probable that the outbreak of typhoid fever was due to the temporary use of the water from the contaminated wells. The fact that some of the cases did not develop until nearly a month following the use of this water is of no significance when it is remembered that these patients are insane and that hemorrhages and perforation occurred during the supposed first week's illness. Milk and other sources of infection may be eliminated.

RECOMMENDATIONS.

Some arrangement should be made so that no water from these wells could find its way into the distribution system at any time, or these wells should be repaired and the water examined to see that they are rendered safe.

TYPHOID FEVER AT GAMBIER.

On August 7, 1913, in compliance with the request of Dr. Blake, the epidemiologist visited Gambier to investigate an outbreak of typhoid fever.

His report follows:

Gambier, a village with a population of 537, is situated in Knox County. The village is surrounded by a farming community, and there is a college known as Kenyon College situated within the corporate limits, with an attendance of about 100 students. There is also a preparatory school for girls, known as Harcourt School.

The first case of typhoid fever in 1913 developed on May 26th. In 1912, only one case was reported. The record of cases for 1913 follows:

Cases.	*Date.*	*Cases.*	*Date.*
1	May 26th.	1	July 16th.
1	June 3rd.	1	July 24th.
1	June 6th.	1	July 29th.
2	June 15th.	2	July 31st.
1	June 25th.	1	Aug. 2nd.
1	June 30th.	2	Aug. 3rd.
2	July 1st.		

The cases in May and June were members of a railroad section gang and boys who went swimming in the Kokosing River and used water from a grossly polluted spring. There appear to have been two separate outbreaks, one occurring in the latter part of May and early part of June and the other in July and August.

The approximate ages of the patients were as follows:

Number.	*Age.*	*Number.*	*Age.*
1	7	1	23
1	9	1	25
1	12	1	27
2	13	1	32
1	14	1	35
1	17	1	36
1	20	1	40
1	21	2	45

During the first outbreak all but one of the patients were adults. In the last, a number of the patients were children.

WATER SUPPLY.

The college and a number of the village residences derive their water supply from four wells, each 69 feet in depth. The water is pumped into a standpipe and then to the college and private houses.

Since the flood of 1913, one analysis of the water from these wells was made in the hygienic laboratories. No chemical examination was made and the bacteriological examination revealed only 20 bacteria per c. c. and no B. coli in 10 c. c.

Water used for drinking and domestic purposes is drawn by the majority of the population from wells and cisterns. The wells, as a rule, are shallow and the cisterns poorly constructed so that contamination is able to penetrate through crevices in the sides or through the curbing. Of eight samples of water taken from representative wells and cisterns, six were found to contain B. Coli, one showed the presence of an atypical colon bacillus and one was negative.

SEWAGE DISPOSAL.

There is no system of sewerage in Gambier. The majority of houses have dug vaults in the rear, while the various college buildings possess leaching cesspools, which are situated in a pervious formation and drain toward the Kokosing River. It has been the custom to use these vaults until they become full and then cover them over and construct others. The result of this policy, and the numerous dug vaults in the village, is that the soil is grossly polluted and the shallow wells and cisterns are in turn contaminated.

MILK SUPPLIES.

There are four dairies which supply the village, with the exception of a few families who keep cows. Milk is prepared by all these dairies in the insanitary manner common to villages and rural districts. Neither the vessels nor the bottles are sterilized, and the milk is not properly cooled.

Only one milkman is implicated in the present outbreak of typhoid fever. One case was supplied by each of the other three, and there could be no suspicion that their product was the means of spreading the disease. Dairyman A, however, supplied all cases that occurred in July and August and several that occurred in June. The dairyman's wife and one child also contracted typhoid fever.

In an endeavor to prevent the spread of typhoid fever at once, the following methods were suggested and intended to close all avenues of infection. It was recommended:

1. That all privies be placed in as sanitary a condition as possible and tightly screened to exclude flies.

2. That all water used for drinking purposes be boiled with the exception of the college water. It was recommended that wherever possible this supply should be used.

3. That the route of Dairyman A be discontinued.

4. That anti-typhoid vaccine be used as widely as possible.

5. That no vessels or bottles used in homes where there is a patient with typhoid be handled by the dairyman.

In addition different methods for the maintenance of wells and cisterns in a sanitary condition were explained.

It is probable that the infection of the milk may be explained by the fact that one of those who took care of the supply visited and nursed a typhoid case two weeks previous to the general milk outbreak.

On September 7th, another visit was made to Gambier. It was found that only one case of typhoid fever had developed since the previous investigation, and none after the effects of the recommendations were experienced. Fifty persons had received the anti-typhoid vaccine. The privies were being rapidly placed in a sanitary condition as far as their limitations allowed, and the water from cisterns and wells was not being used or used only after being boiled.

The dairyman, whose product was thought to be responsible for the outbreak, was allowed to resume his route on the understanding that neither of the patients who had recovered from typhoid in his family should have anything to do with the preparation of the milk. The privy was to be screened and lime applied after each use, and the outhouse should be screened. The dairyman was instructed to report at once the appearance of any future sickness on his route. He was instructed to sterilize his bottles and cans and the method was explained to him.

The importance of some uniform system of sewage disposal for the college dormitories and buildings is evident. The use of privies of the type mentioned is a menace to the health of the citizens of the village and students. It is difficult to devise any efficient system of dairy inspection in a village like Gambier, but cases of typhoid fever and other communicable diseases should be promptly reported to the health officer and he in turn should ascertain the milk supply, so that a milk-spread epidemic could be prevented or restricted to the first few cases.

TYPHOID FEVER AT PIQUA.

On September 12, 1913, in compliance with the request of the health officer, the epidemiologist visited Piqua to investigate an outbreak of typhoid fever.

His report follows:

Piqua, a city with a population of 30,388 in 1910, is situated in Miami County. It is surrounded by rich agricultural country. In March 1913, Piqua suffered severely from the effects of the heavy precipitation and the consequent flooding of the streams in Miami County.

The number of cases of typhoid fever in Piqua in 1913 is shown in the following table:

	Cases.	*Deaths.*
January	1	1
February	0	0
March	0	0
April	0	0
May	1	0
June	2	0
July	4	0
August	8	1

On August 22, a case of typhoid fever developed at one of the dairies which supply Piqua with milk. This case was reported by the attending physician to the township health officer within whose jurisdiction the case existed, but no mention of the case was made to the health officer of Piqua. During the week beginning August the 8th, fourteen cases of typhoid fever were reported as occurring on this dairyman's route. The health officer made an investigation and reported his findings to the board of health who recommended that the dairy be removed to another farm a quarter of a mile distant, and that those who nursed the typhoid patient should have nothing to do with the milk. These directions were immediately carried out by the dairyman. During the course of this investigation the dairy was visited and was found to be in as sanitary a condition as is usual among such dairies. One of the men who was looking after the dairy had had typhoid fever several years ago. Probably the direct cause of the outbreak was that the father of the patient acted as nurse and also aided in the collection and preparation of milk.

Since the publicity occasioned by this outbreak had practically stopped the sale of this dairyman's milk, he was advised to discontine his route for the present which he promised to do immediately. The board of health of Piqua was advised to make a thorough investigation to determine whether all cases of typhoid were due to this milk outbreak or whether other causes could be found.

This epidemic emphasizes the necessity of the prompt report of all cases of typhoid, not only at the dairyman's home and among his employes, but also among his customers. This should be insisted upon by all health officers.

NOTE — The measures proposed were effectual in preventing the further spread of typhoid fever.

TYPHOID FEVER AT TROY.

On July 30, 1913, the epidemiologist was sent to Troy to aid in preventing the spread of typhoid fever.

His report follows:

Troy is a city with an estimated population of 6,500, situated in Miami County. Cases of typhoid fever have been few in number for the last few years, since the present public water supply was installed. The supply is derived from three groups of wells, and the whole is described in detail in reports submitted by the Division of Engineering. The surroundings of these wells have never been considered satisfactory, and evidences of past pollution have been frequently found in samples of water submitted for chemical examination. B. coli were found also on one occasion in 50 c. c. portions.

The present outbreak of typhoid fever began about July 1st. or the week previous. Several car-loads of natural ice from Sandusky Bay, Lake Erie, were shipped to Troy about June 15th. On or about July 7th, a number of cases of typhoid fever was reported and it was rumored that many more were developing. It was found that four-fifths of the cases were on one dairyman's route, and the health officer advised him to boil his bottles and containers and not use water from his wells for washing milk utensils, as it was evidently not properly protected from pollution.

On the date of investigation the health officer had official reports of only five or six cases, although he knew that other cases existed. A meeting of the board of health was called and they were advised to secure daily reports of all cases of typhoid fever and suspects from all physicians, and to keep an official record of the same. They were also advised to attempt to prevent the spread of typhoid fever pending investigation, by closing all possible sources of infection. Towards this end resolutions were proposed and passed, to stop the sale of milk on the suspected route, to prevent the use of natural ice in any beverage, to screen all privies so that flies could not have access to the contents, to employ an inspector to see that these and other regulations of the board are carried out. In addition, notices were published in the daily newspapers, regarding the measures taken by the board of health to prevent the spread of typhoid fever. Notice was also given that only the city water supply should be used for drinking purposes as wells and cisterns are not known to contain pure water, and that visiting of typhoid fever cases should be discontinued.

The health officer stated that it was almost impossible to secure reports of cases from physicians. The board was, thereupon, advised to take immediate and summary action to enforce the report of all cases. The epidemiologist visited many of the physicians, and secured reports of forty cases. Many of these are said to be atypical and extremely mild and were called by some physicians "intermittent" and "bilious intermittent" fever. Malaria caused by the malarial plasmodium, is very rare in Ohio, and this is generally acknowledged by those physicians whose experience it at all extensive. It is probable that all cases in Troy are caused by the same organism, a member of the typhoid group.

Blank forms were left with the inspector appointed by the board of health, and certain information will be collected which will lead to the detection of the sources of infection.

It may become necessary to make further examinations of the public water supply.

The measures suggested were such as would prevent the further spread of typhoid fever, pending investigation of the possible sources.

NOTE — The measures outlined were successful in preventing further spread of the disease.

TYPHOID FEVER AT WAGRAM.

On October 24, 1913, in compliance with requests from a number of citizens, the epidemiologist visited Wagram, to investigate an outbreak of typhoid fever.

His report follows:

Wagram is a non-incorporated community in Etna Township, Licking County, with a population of about 200. Typhoid fever has prevailed there for some years. There have been twelve cases this year, and about the same number last year. There were two deaths in 1912 and one death in 1913.

All the homes in which cases of typhoid fever occurred in 1913 were visited, a history of the patients taken, and the premises inspected. In three families secondary cases had occurred, and in one, four cases developed in the course of two months, the last three cases clearly due to contact infection.

There appeared to be no common sources of infection discoverable, and the cases did not develop within a short period of time, as in an epidemic. In other words, typhoid fever appears to be endemic in Wagram. The privies are of the usual insanitary type found in rural districts. The vaults are not water-tight and the contents contaminate the soil. All the wells are liable to surface and soil contamination from nearby privies.

To remedy these conditions at Wagram and to prevent the recurrence of typhoid fever, the following measures are necessary:

1. All cases must be reported to the health officer, and by him to the State Board of Health.

2. All privies should be made water-tight and be properly screened. The vaults should be made with a clean-out extension in the rear. The privies should be placed as far as possible from the wells.

3. The wells should be protected from surface contamination by tight curbing.

4. The families in which cases occur should be instructed in the care of patients, so that contact infection will be prevented.

5. An efficient and energetic health officer is needed to see that these recommendations are put in force at once.

SANITARY CAMPAIGN AT DRESDEN AND TRINWAY.

On April 18, 1913, the epidemiologist visited Dresden to investigate the sanitary conditions in the flooded ditsricts.

His report follows:

Dresden, an incorporated village with a population of 1,500, is situated on the western bank of the Muskingum River. The flood waters of 1898 did not reach the village proper but in March 1913, the flood was 11.6 feet higher than ever before and at least half of the village was submerged. Several houses were carried away; some manufacturing plants and mercantile establishments suffered heavy losses in material and damages, and the loss to private property was comparatively heavy.

On March 30, 1913, a health officer was appointed by the Ohio State Board of Health, since the local board of health and health officer refused to act. He, in conjunction with the mayor and council and the physicians of the village, began at once to restore Dresden to a sanitary condition in accordance with the instructions of the Ohio State Board of Health. Six teams and fourteen men were employed and a proclamation was issued that every householder should place his premises in a sanitary condition within a certain time under pain of prosecution. Three hundred fifty pound bags of lime were distributed and proved sufficient to whitewash every cellar, to disinfect vaults, to spread over all objectionable material deposited by the flood and to scatter over lots and dumps. A steam pump was used to pump the cellars dry. The teams and men cleaned all rubbish from the streets and alleys all over the village. One thousand loads of garbage and rubbish were carried out at an average cost of 30 cents a load.

The pumping station was submerged and the public water supply shut off for two days. The reservoir, however, stood high above the flood area and as soon as the waters receded the public was supplied from the reservoir. The water is drawn from deep-driven wells and is of good quality. At the time of investigation the sanitary conditions were very good. A portion of Dresden known as the "Old Town" suffered most heavily, several houses being carried away.

Trinway suffered only slightly from the flood; only the outskirts of the village showing any ill effects. At the time of the investigation the sanitary conditions were normal.

Only one case of typhoid fever existed in Dresden and the patient had taken sick in Cambridge. No other cases of contagious or infectious diseases were found in Dresden or Trinway.

SANITARY CAMPAIGN AT McCONNELSVILLE.

On April 23, 1913, the epidemiologist visited McConnelsville to investigate the sanitary conditions following the flood.

His report follows:

McConnelsville, an incorporated village with a population of 1,831, is situated on the eastern bank of the Muskingum River. The flood waters covered nearly two blocks of all the streets running at right angles to the river, and in some situations a much larger area. Several houses were washed away; many others torn from their foundations. Several manufacturing plants sustained great damage and heavy losses. The village was entirely shut off from communication with the outside world; the railroad facilities being entirely disorganized and the canal so damaged that it was not until the 24th of April that navigation was possible. The steel bridge between McConnelsville and Malta was destroyed.

The sanitary campaign was placed in charge of the department of public service and fifteen men and all available teams were pressed into the work. Streets were opened, rubbish was removed and houses restored to their foundations. Many of the cellars did not require pumping out owing to the good natural drainage, but this was done where necessary. The pumping station had been submerged and the public water supply was shut off for eight days. The water in the reservoir had been saved, however, and this, and a number of deep wells outside the flooded area, furnished an abundance of pure water. The privies and vaults within the flooded districts had been buried deep in silt. Where necessary they were cleaned and disinfected and outhouses constructed. All rubbish and dead animals were buried.

Communicable diseases did not exist in McConnelsville during this time and none have been reported since.

The sanitary campaign had already cost $1,200. and an additional $3,000. was requested of council of which $500. was to be used by the board of health. The conditions upon leaving the municipality were good; all but one house having been cleaned and the village was in an excellent sanitary condition. Several wells in the flooded area were condemned. The little that remains to be done will be accomplished under the direction of the board of health.

SANITARY CAMPAIGN AT MALTA.

On April 24, 1913, the epidemiologist visited Malta to investigate the sanitary conditions following the flood.

His report follows:

Malta is a village with a population of 900. The flood waters affected 498 individuals. Of the 245 houses of which the village is composed, 135 were invaded and 100 were above water. Thirty-six mercantile establishments were flooded and six manufacturing plants washed away. The water supply was suspended for only a few days as the pumping station was under water.

The sanitary campaign was carried on under the direction of the mayor and council aided and advised by a physician. Streets were first opened, then cleaned, next attention was directed to private houses and business blocks. Cellars required little attention as the natural drainage was good owing to the character of the soil. Rubbish, dead animals and vegetable matter was quickly hauled away and burned or buried. The lack of means of communication rendered food scarce and it was impossible to secure lime. Farmers from the surrounding territory supplied the former and two car loads of lime were expected to arrive on the 24th instant.

One case of suspected typhoid fever followed the flood and two cases of smallpox, present before the flood, had recovered and been dismissed. The sanitary conditions in general at the time of the investigation were excellent.

SANITARY CAMPAIGN IN ZANESVILLE.

On March 27, 1913, the epidemiologist and an inspector of the Ohio State Board of Health reached that portion of Zanesville accessible from the west. The business portion of the city was cut off from the west side by the flood waters.

The report of the sanitary campaign follows:

On March 27, 1913, the flood waters had not abated and separated the old Seventh and Eighth wards and portions of Putnam which were not submerged, from the city proper and the Terrace. All but the Fifth Street and Y bridges had been destroyed, the approaches to the former were deeply submerged and the currents were so swift that no boat could cross from the old Seventh Ward to the heart of Zanesville.

The health department had its headquarters in the business section of the city and was completely shut off from the old Seventh and Eighth wards and Putnam. The first duty was then to establish a temporary department of health in this part of the city. The citizens' relief committees, of which there were two in this district, had appointed two health committees whose work was faithfully done in spite of the fact that they were handicaped for lack of physicians. The chairman of the relief committees was requested to dismiss the health committees, and volunteers were called for to act as sanitary inspectors. Seven individuals volunteered to give their whole time and obey instructions and were allotted into seven districts into which the territory was divided. These inspectors were given written instructions, similar to thise issued to the sanitary inspectors afterwards appointed for the whole city of Zanesville. Headquarters were established, a stenographer and clerk secured, and inspectors were requested to report at the office daily. All reports and complaints were recorded and a physician investigated the suspected cases of contagious and infectious diseases. In addition, a smallpox hospital was established and guards and nurses secured.

On March 27th, there were in this part of the city seven cases of smallpox, nine cases of scarlet fever, five cases of typhoid fever and one case of chickenpox. In view of the fact that smallpox was prevalent, it was decided to placard all cases of chickenpox and to establish a modified quarantine. The cases of typhoid fever were reported on the 29th of March and were widely scattered. The dates of onset show that they were contracted previous to the flood. On March 29th, several cases of smallpox were found in South Zanesville and an inspector of the State Board of Health was sent there to take charge of the situation. The conditions found in South Zanesville are described in a separate report. On the same date communication with the business section of Zanesville was re-established as the flood waters had resumed their normal limits. Only on this date was it possible to estimate the damage and secure a true idea of the conditions left by the flood. As the pumping station was under water the public water supply was cut off. Many sewers were blocked and broken. Scores of houses were torn from their foundations and many others were unsafe for occupation. In Putnam some cases of smallpox had escaped quarantine because of the flood and exposed a large number of individuals. Because of the comparatively high ground surrounding Zanesville the mortality was very low, only two deaths being ascribed to the flood. For the same reason the supply of food was never scarce as most of the refugees could be reached by farmers who daily carried into Zanesville supplies of food. While the private property loss was great, the corporation of Zanesville suffered hardly at all.

On March 29th, the Zanesville Board of Health met with a representative from the United States Public Health Service and the epidemiologist, to formulate plans for re-establishing sanitary conditions in the flooded districts. A plan of campaign was suggested by the representative from the United States Public Health Service and was immediately adopted. A chief, associate and advisory sanitary officers were selected and the flooded sections were divided into seven districts. A well-known physician was chosen as sanitary officer for each district and letter heads, printed instructions and blanks for recommendations and sanitary orders were printed immediately. All of the physicians selected agreed to accept the responsibility and to set up headquarters each in his district, and to choose as many assistant sanitary officers as he deemed necessary.

Each recommendation was submitted by a sanitary officer, these were filed and sanitary orders issued, usually to the director of public service or to the head of any other department concerned. The council on request appropriated $25,000. to be exepnded by the board of health in the sanitary campaign. The director of public service, an experienced and capable contractor, was placed in charge of the actual work and all orders were issued to him by the chief sanitary officer. The newspapers published articles of interest and value to the public containing advice and instructions which were deemed necessary for them to follow. The director of public safety employed an extra force of men to inspect buildings within the flooded area and condemn those that were unsafe for occupation.

For the first few days the work of removing dead animal and vegetable matter, opening the streets and alleys so that the citizens could reach their homes, and the fire department respond to alarms, was paramount, but in a very short time this part of the work was disposed of. It soon became necessary to locate convenient sites where rubbish and garbage could be disposed as the supply of lime was at first limited. Two sites were chosen for decaying and putrescible material and others for rubbish that could be incinerated. Later other sites were chosen for garbage and a quantity of lime thrown over each load as it was dumped.

In general the instructions outlined by the Secretary of the Ohio State Board of Health were carried out. Privies and vaults were cleaned and filled and outhouses constructed. In the meantime a force was orking night and day to start the pumps at the pumping station which had been entirely submerged. In two days after the flood waters receded water was pumped into the distribtuion system through the greater part of the city. Gas and electricity were not turned on for some time to come.

The public water supply at Zanesville, at all times polluted, was in a worse condition than usual on account of the flood. The necessity for safe water for drinking purposes was accentuated by the report of a number of cases of typhoid fever seven to ten days following the flood. Large water tanks ordinarily used for sprinkling the streets were filled with water from the mains, connected with a steam hose, and steam allowed to flow into the water until the boiling temperature was maintained for ten minutes. These tanks were then stationed at various places in the city where citizens could secure small amounts by means of faucets which had been fitted for the purpose. This water had lost none of its turbidity and many individuals refused to make use of it for esthetic reasons. It was felt, therefore, that a better plan should be devised and it was suggested by the representative of the State Board of Health that a temporary hypochlorite plant be constructed at the pumping station so that the entire public water supply could be made safe. An engineer of the State Board of Health made the necessary plans and the construction was left to the city engineer. As the plant was to be only temporary, it was thought advisable to reduce the expense as much as possible, so that brewing vats were secured in place of cypress tanks. Three of these vats were used, each of 1,200 gallon capacity and capable of holding an eight-hour charge. One part per million of the hypochlorite was used and the day after the plant was placed in operation, samples of water were analyzed showing that the water at the intake and on the distribution system was badly polluted, while in the reservoir and near the pumping station only a few bacteria and no B. coli were found. Later samples were taken at various points on the distribtuion system when it was expected that the treated water had reached these points. The results of the examination of these samples showed them to be of good sanitary quality. This plant cost less than $150. and the operating expenses were so slight that an actual saving was accomplished, as the expense for the teams and men necessary to haul and fill the tanks was heavy. On and after April 14th, the plant was operated continuously.

Immediately after outlining the plan of campaign, ten car loads of hydrated lime, and a car load of washing soda and crude carbolic acid were ordered. The lime was distributed throughout the flooded districts and placed in convenient form at the intersection of streets so that individuals could secure the quantity they needed. The carbolic acid was diluted and given out in small quantities and the washing soda was also distributed.

Aside from the execution of sanitary orders the public service department was engaged in opening streets and alleys, removing débris, repairing sewers and water mains, building outhouses and removing garbage. The flood deposits removed from cellars and lots were placed on the streets by the owners or tenants of the houses and lots, and hauled away by the city teams. Flushing and sprinkling of the streets was begun as soon after the flood as possible as the clouds of dust from the dried flood deposits became very obnoxious.

In spite of the limited number of teams it was possible to procure, the work was carried on very rapidly and the essential steps to place Zanesville in a sanitary condition were taken as rapidly as could be expected. In order that there might be no criticism of the department, the services of an auditor were secured and a system devised so that no orders for maaterial or supplies were issued except by the chief sanitary officer and his associates or the director of public service. In addition a copy of each sanitary order was filed at the sanitary headquarters when the work was completed and as the recommendations of the district sanitary inspectors were also kept, a complete record of all work could be found at all times in the office.

CONTAGIOUS AND INFECTIOUS DISEASES PREVIOUS TO THE FLOOD.

Scarlet Fever.	*Smallpox.*	*Chickenpox.*	*Typhoid Fever.*	*Diphtheria.*
10	8	1	0	0

FOLLOWING THE FLOOD.

Scarlet Fever.	*Smallpox.*	*Chickenpox.*	*Typhoid Fever.*	*Diphtheria.*
1	11	1	29	3

TYPHOID FEVER.

In a city with a water supply such as Zanesville possesses, consisting of an untreated water from a river liable to considerable pollution, the typhoid rate is generally high. The history of typhoid fever in Zanesville during the last four years is as follows:

Year.	*Deaths.*	*Estimated Cases.*
1909	13	130
1910	14	140
1911	45	150
1912	22	220

The death rate per 100,000 population in Zanesville is eighty-four, which is higher than that of all but two municipalities in Massachusetts as recently published in their monthly bulletin.

Judging from this data it would seem important that the hypochlorite plant be operated until the contemplated system of water purification is in operation.

A large amount of typhoid vaccine was used in Zanesville some of it being supplied through the Ohio National Guards and some through the United States Public Health Service. Vaccinations were performed free at the office of the chief sanitary officer and many individuals availed themselves of this opportunity. In addition, many physicians in charge of districts performed vaccinations while carrying out their sanitary work. Several hundred c.c. of the vaccine were used. No dangerous reactions occurred nor were any untoward symptoms observed.

SMALLPOX.

Some cases of smallpox which occurred preevious to the flood were in the flooded districts and had to break quarantine when the waters invaded their home. Many exposures resulted from this. Within two weeks from the date of the flood the cases mentioned above developed and it is probable that very few more will arise, as all exposures were vaccinated and gratuitous vaccination was performed both at the office in the old Seventh Ward and at headquarters.

The cases of scarlet fever, except one, occurred previous to the flood and were the result of a wide-spread epidemic.

The cases of diphtheria developed in buildings used to house refugees and prompt action was taken in securing temporary isolation quarters. In addition, since hospital accommodations were strained to their utmost, two hospital tents were erected, equipped and floored in case of need, and guards appointed. Two tents, one for the nurses and one to cover latrines were erected.

A proposal to build a tented city was submitted to the department of health through the militia. This was rejected as the site proposed was unsuitable and would result in the pollution of the spring which furnished clear and safe water to many in the flooded districts. In addition, tents are unsuitable for a semi-permanent camp and in their stead it was proposed to utilize three school buildings which were equipped with cooking ranges and privy vaults.

The Ohio National Guard was of great help in preserving order, in caring for refugees and aiding in the sanitary campaign. Three buildings in which refugees were housed were watched carefully by the medical corps and this relieved the sanitary officer of much responsibility.

CONDITIONS UPON LEAVING THE MUNICIPALITY.

The conditions upon leaving Zanesville were as good as could be expected from a sanitary point of view. The public water supply was safe. The sewers were clean, flood deposits had been removed and garbage was being collected at least as carefully as usual. Communicable diseases appeared to be under control. Only in the old Eighth Ward should the sanitary campaign still be carried on, for this section of the city suffered the most and individuals are only now returning to their homes.

INVESTIGATION OF THE SANITARY CONDITIONS AT MASON SCHOOL.

On November 30th, in compliance with a request, the epidemiologist investigated the sanitary conditions at the Mason School, Mason, Ohio.

His report follows:

The Mason school, consisting of grammar and high school grades, is housed in a building whose construction was only completed in October 1912. The building is modern in every respect. A drilled well supplies the furnaces and lavatories with water and air-compression is used to pump the water and maintain a sufficient pressure. The toilet facilities are ample, and in fact sufficient to accommodate twice the present number of pupils. Flush-closets of modern type are provided. The urinal in the boys' toilet is provided with an automatic flusher, which, however, was not in use on the date of investigation. The contents of the flush-closets and urinal drain into a cesspool and are then conducted to a small filter bed about 400 feet from the building. The over-flow pipe was not working properly when investigation was made.

Two modern sanitary drinking fountains supply the pupils with drinking water. One is placed on each floor of the school. The heating arrangements consist of Bartlett furnaces amply large enough for the building. Electrically-controlled thermometers are placed in each room and connected to a registering device in the basement. The janitor reads the temperature in each room every half hour during school hours. These readings showed that the temperature on Novembr 28th varied between 62° F. and 74° F. The air is drawn from the outside, heated and forced by a large fan into the school rooms. Before reaching the rooms it is automatically moistened.

When school opened in September 1913, it was found that the well had been tampered with and the flow of water blocked. Not until the middle of October was this condition remedied, and the toilets could not be used. Drinking water was, however, furnished and outside privies used while repairs were being made. The heating arrangements were also interfered with for a short time by a break in the machinery. When the overflow pipe of the cesspool is corrected and the automatic flusher of the urinal adjusted to flush at least every half hour, conditions in the Mason School from a sanitary viewpoint, will be quite satisfactory. These faults, however, should be corrected immediately.

ERUPTIVE DISEASE AT THE MARBLE CLIFF SCHOOL.

On December 1st, upon request, the epidemiologist visited Marble Cliff School to investigate an outbreak of an eruptive disease.

His report follows:

Marble Cliff School is situated in a special district known as Marble Cliff School District, Franklin county. About one hundred and fifty children are pupils.

Several weeks ago the principal and teachers noted the development of sores and suppurative conditions among the pupils. These conditions seemed to spread by contact, and soon nearly thirty children were affected. On examination one case of eczema of the auricle, several cases of impetigo contagiosa, and one or two children with suppurative conditions were found. Evidences of the presence of pediculi were also detected and some of the erythema observed at the junction of the scalp and neck was ascribed to this cause. Some of the children showed marked evidences of mal-nutrition, and others were evidently of a scrofulous diathesis. The face, hands, and persons of the scholars examined were unclean.

There are no conveniences furnished in the school for washing the face and hands. The teachers sometimes allow the children to use granite basins. A common drinking cup is employed. The privies are of the ordinary type found in rural districts.

It is probable that want of personal cleanliness on the part of the scholars, and the opportunities for infection afforded by the common basins (without flowing water) and the common drinking cup, are the initial causes of the skin diseases found. The common drinking cup should be abolished at once and each pupil taught to use his or her own glass or cup, only. As water pressure is developed, a sanitary drinking fountain should be installed at once. Sinks and basins with running water should be provided. If personal cleanliness is not taught and practiced in school, the children will probably never learn to be clean.

As to the skin eruptions, children with such conditions should either be forced to remain at home until they have been cured, or better still, a nurse should be employed to advise pupil and parents and inspect the whole school from time to time. Whichever of these plans is adopted, the installation of modern sanitary lavatories should be begun at once. It is a disgrace that children should be forced to attend a school without these conveniences.

SANITARY CONDITIONS AT STATE FAIR GROUNDS.

On September 19, 1913, the epidemiologist visited the State Fair Grounds to investigate the methods in use for the disposal of the manure and refuse occasioned by the State Fair.

His report follows:

The large amount of refuse and manure which remained after the State Fair is being rapidly removed. The manure from the cattle and horse barns is disposed of in three ways. There is a dump on the property of Mr. Innis on the west side of Wilnis Street, about fifty yards north of Seventeenth Avenue. This dump measures forty-seven by fifty-five yards and is from two to four feet in depth. There is a fairly thick covering of straw with a slight admixture of manure. The manure is rotting badly in places and flies are breeding rapidly in these situations. The odor is not very noticeable. There is no evidence of any lime being placed on this manure.

The second dump is situated within the Fair Grounds, on the northwest corner, about twenty yards south of Seventeenth Avenue. It measures ten by twenty yards and is about five feet in depth. After each load of manure is placed on this dump a bucket of lime is poured over. The manure does not appear to be rotting and the odor is not very noticeable. Flies are not very numerous. To the right of this dump is a small stagnant pond.

The straw which composed the bedding for the horses and cattle and which contains a very small admixture of manure is spread over the race track to a depth of about twelve inches. This straw is not rotting and no nuisance is occasioned on the track.

The barns and stables are in a fairly sanitary condition and practically all the manure has been removed. The roads leading to the various dumps are overlaid with a thin layer of straw, dropped from the wagons.

RECOMMENDATIONS.

1. It is recommended that a larger amount of lime be placed over the different dumps and that when all the manure has been placed thereon, a thick covering of lime be added.

2. The dump at the north-west corner of the grounds should be covered and protected from rains.

INVESTIGATION OF DRINKING WATER ON PASSENGER BOATS.

On June 2, 1913, the epidemiologist was sent to Cleveland to investigate the condition and take sample of the drinking water used on the boats of the Cleveland and Buffalo Transit Company and the Detroit and Cleveland Navigation Company.

His report follows:

BOATS OF THE CLEVELAND & BUFFALO TRANSIT COMPANY.

The Cleveland & Buffalo Transit Company operates two passenger boats between Cleveland and Buffalo; one leaving Cleveland in the evening and reaching Buffalo the next morning, returning from Buffalo the next evening, while the other boat departs from Cleveland so that a daily trip is made between these points.

The method of securing and storing water is the same on both these boats so that a description of the "City of Buffalo" will suffice. Until the summer of 1913, it has been the custom to secure the water from Lake Erie between twenty and thirty miles out of Cleveland but this method has been abandoned this year because of the unusual turbidity. The water is much clearer within thirty miles of Buffalo so that water for drinking purposes is secured between twenty and thirty miles out of Buffalo. This water is stored in four large steel tanks, two of which are three feet in diameter by eighteen feet in length, and two three feet in diameter by twenty-one feet in length. From these tanks the water is pumped into pipes which pass through a refrigerator and thence to the faucets. The tanks are emptied once a week and flowing steam passed through them by means of a set of pipes which are connected with the tanks. This process is continued for from thirty minutes to an hour. The tanks are then cleaned and swept out and thoroughly rinsed. Three samples of water were taken, two from the tanks immediately after filling and one from a tap in the main cabin. An inquiry was made to determine whether there had been any sickness among the employes on the boat and it was found that there had been no cases of illness among them for the last two years. The samples of water collected were examined in the hygienic laboratories and the interpretation follows:

"These three samples of water all show the presence of a high number of bacteria per c.c. The presence of the colon bacillus was not detected in 10 c.c. These waters at the present time may be used for drinking purposes."

Only one improvement in the method of caring for this water supply can be suggested. The tanks should first be cleaned and rinsed and flowing steam should then be turned in for at least thirty minutes. In this way there would be no possibility of contamination after sterilization had been effected.

BOATS OF THE DETROIT AND CLEVELAND NAVIGATION COMPANY.

The Detroit and Cleveland Navigation Company operates two boats between Cleveland and Detroit which make alternate trips. Some of the water used for drinking purposes is collected from the hydrants in Cleveland but the larger part is taken directly from the lake. Water is pumped into three steel tanks (3 feet in diameter by 18 feet in length) at a point between forty and sixty miles from Detroit, and from these tanks after passing through a refrigerator, the water reaches the faucets. Two samples were taken, one from a tank immediately after it had been filled and one from a tap in the second cabin. Both these samples showed the presence of a high number of bacteria per c.c. and the presence of the colon bacillus was detected in 1 c.c. and 10 c.c. portions. The water was, therefore, unsafe for drinking purposes at the time of collection. These tanks are cleaned out once a week and thoroughly rinsed but no sterilizing process is used. It is, therefore, recommended that steam pipes be fitted to these tanks and flowing steam under pressure used for a period of at least thirty minutes immediately after cleaning. It is also recommended that water be secured at a point more distant from the land and that further samples be submitted so that the water from the new source may be examined.

REPORT

OF

DIVISION OF TUBERCULOSIS

REPORT OF THE DIVISION OF TUBERCULOSIS.

HISTORY.

This Division of the State Board of Health began its work on May 15, 1913. Therefore this report covers the work which has been performed between May 15th and December 31st, 1913.

The creation of the Division of Tuberculosis was due to the activity of the Ohio Society for the Prevention of Tuberculosis, the Ohio State Medical Association and the Ohio State Board of Health which has carried on an active educational campaign in the state from May 1, 1911. In the fall of 1912, a carefully organized plan of campaign was undertaken to secure a state appropriation for tuberculosis work. The legislature included in the 1913 appropriations for the State Board of Health $20,000.00 for the Division of Tuberculosis.

ORGANIZATION OF THE DIVISION.

On May 15, 1913, the initial step was taken in the organization of the Division by the appointment of the Chief of the Division. Additional appointments made at this time were Miss Margaret Kamerer as state supervising nurse; Miss Louise Mark as statistician; and E. W. Kolthoff as state organizer. On June 1st the appointments of Miss Sara Kerr as assistant statistician and Mr. Walter E. Spencer as superintendent of exhibits were made. On January 1, 1914, Miss Catherine McNamara was appointed as instructive nurse to accompany the exhibit. These appointees together with three stenographers constitute the members of the staff of the Division.

On June 26, 1913, the State Board of Health by resolution requested the Executive Committee of the Ohio Society for the Prevention of Tuberculosis to act as an advisory committee to the Division of Tuberculosis.

SCOPE OF WORK UNDERTAKEN.

1. *Notification of Communicable Diseases.*

This specific field of work lies at the basis of all successful public health work and is the most neglected. Steps were taken at once to institute a system of following up the reports that came into the offices of the Board in order to encourage the local health officials to make regular reports. There are approximately 2,200 health districts in the state. At the end of May, 1913, reports were received from 76% of the cities, 40% of the villages and 22% of the townships. For the state as a whole the proportion of health officers sending in complete reports was 30% or 3 out of every 10. At the end of December reports were received from 100% of the cities, 86% of the villages and 84% of the townships. This result merely indicates that the health officers were responding to the follow-up system. The actual reports of the presence of a communicable disease does not show such encouraging results for at the end of December the reports for that month show that approximately 900 health districts reported the presence of one or more communicable diseases, while 850 health districts report no new cases present in their district during the month and from 250 health districts no reports were received. From various sources of information it was ascertained that in a large number of these 850 health districts, reportable disease did exist during the month. Many of these health officers were aware of the situation as is shown by the fact that upon their report blanks they recorded "none reported to me". This was frequently supplemented by the health officer in a foot-note stating that "such and such a physician never reports to me". A system of following up such complaints has been inaugurated whereby the physician so cited is sent a letter and leaflet calling his attention to the law governing the notification of communicable diseases and the purpose of the state in keeping careful record of the presence of these diseases in the state. In addition the attention of the health officer is called to his responsibility in securing such reports upon his own initiative.

This situation indicated either that the system of health administration in the state is on the wrong basis or that the State Board of Health should increase the facilities of this bureau in order to make possible a close personal contact with every health district in the state.

2. *State Organizer.*

Following out the plan inaugurated by the Ohio Society for the Prevention of Tuberculosis of organizing local anti-tuberculosis societies, the state organizer has been successful in completing the organization of six societies. There are thirty organizations in the state during the period covered by this report. In addition to this work, the supervision of the printing of the Monthly Bulletin and other pamphlets issued by the Board has been a part of his work.

The following educational literature has been issued under the direction and supervision of the Division:

"How to Avoid Consumption," a six page leaflet.

"Tuberculosis Equipment in the State of Ohio", a pamphlet of seventeen pages descriptive of the various agencies organized for fighting tuberculosis including a map of Ohio showing deaths by counties in 1912 from tuberculosis.

"Public Control of Tuberculosis in Ohio", a pamphlet of ten pages giving the laws now in force in the state governing the erection of District Hospitals for Tuberculosis and the employment of visiting nurses by counties or districts.

"Tuberculosis — What You Should Know About it", a pamphlet of twenty pages freely illustrated giving in popular language the facts concerning the disease with which the public should be familiar.

"How to Save the Babies", a pamphlet of thirteen pages, freely illustrated, designed to spread information among the people of the state as to ways and means to prevent infant mortality.

"Important Facts about Common Transmissible Diseases", a pamphlet of twenty-four pages, freely illustrated, the purpose of which is to aid the health authorities in the state to restrict the spread and to prevent the occurrence of communicable diseases by giving the public a knowledge concerning such diseases.

"How Unhealthy is *Your* Work?", a four page leaflet, setting forth the causes and means of prevention of occupational diseases.

"The Ohio State Public Health Campaign and Exhibit," a six page leaflet descriptive of the exhibit and the methods of management.

"How About Your Doctor?", a card for use in physicians' offices pointing out the joint responsibility of physician and patient in keeping public health authorities informed concerning the presence of communicable diseases in any community in the state.

"Why Protect Pigs and Forget Children"? a card to be used in store windows in advertising the Ohio State Public Health Exhibit.

"The State Campaign vs. Tuberculosis", a hand bill advertising the Exhibit and used for distribution from house to house in the city to be visited by the Exhibit.

3. *State Supervision of Nurses.*

The public health nurse holds out the greatest single opportunity for successful preventive work which we have at the present and so the efforts to induce local communities throughout the state to install such nurses have been exerted constantly. At the time of the organization of the Division there were 69 nurses employed by 16 cities in tuberculosis work. At the end of December 14 such nurses employed by 12 cities were added to the nursing forces of the state. Nine of these nurses were employed by nine cities as a direct result of the activities of this Division.

The functions of the state supervising nurse are to stimulate local communities to make provision for the employment of a permanent nurse: to secure a supply of suitably trained nurses to fill positions that are created locally; to use every effort to standardize the nursing work throughout the state and to give advice and lend encouragement to the nurses in their daily work.

The task of stimulating local communities to employ permanent public health nurses has not been a very difficult one as the demand for such nurses thus far has been beyond the supply.

The most difficult problem we have had to meet has been to secure a sufficient supply of nurses with proper training to meet the demands made upon us. Through co-operation with the Ohio Society for the Prevention of Tuberculosis, an advertisement was inserted in several of the professional magazines to enable us to open correspondence with nurses desiring to enter this field of work. It was early discovered that most of the applicants for positions, while having excellent training as nurses, did not have the requisite training in social work. A temporary expedient was resorted to whereby the Ohio Society for the Prevention of Tuberculosis entered into an agreement with the Bureau of Tuberculosis, Division of Health, Cleveland, and the Instructive District Nursing Association, Columbus, to give such nurses as we might elect a course of three months work covering in a hasty manner the various fields of service with which a public health nurse must be familiar. The Ohio Society also entered into agreements with certain nurses to pay a scholarship of $100.00 to cover the three months course of training. The nurses to whom such scholarships are granted agree to remain in public health work in Ohio for at least one year after completing the course of training. This plan has served to meet the difficulty in a limited manner. The situation is so acute that some organization in Ohio should assume the responsibility of training a sufficient number of nurses to meet the demand for them that exists throughout the state.

Efforts to standardize the work have consisted in individual conferences with the nurses; in the adoption of a standard system of office record blanks and a monthly report blank, which is received by the state supervising nurse from practically every city in the state where nurses are now employed.

The personal work by the state supervising nurse with the individual nurses serves to bring to them the experience of the entire state and by this means a high type of nursing service will be built up in the next few years.

4. *The Ohio State Public Health Exhibit.*

The Ohio State Public Health Exhibit constitutes the "storm center" of the educational campaign in Ohio. Material began to be gathered early in May for use in its construction. During the summer months the actual assembling of the exhibit went forward in rooms loaned to the Board by the Columbus Y. M. C. A. With the opening of the Ohio State Fair on September 1st, the exhibit was practically complete and was shown to over 100,000 people during fair week.

The exhibit consists of nine wall-standards, each thirteen and a half feet in length and twelve feet in height, which hold fifteen frames 22 x 28 inches. These frames hold cardboards upon which are painted aphorisms or mounted photographs or both, all designed to drive home some point in dealing with a particular disease or condition. Three of these sandards are devoted to the subject of "Tuberculosis", two to "Occupational Diseases", one to the "Prevention of Blindness", one to "Infant Mortality", one to "Communicable Diseases", and one to "Oral Hygiene".

In addition to this method of instruction we make use of three-dimension models to attract the attention of the casual visitor to the exhibit. These models have been built by expert model makers from plans and specifications drawn up by the various members of the staff. Practically every idea represented by the models is presented by the contrast method. They cover the following subject: "Sanitary and Insanitary Cities"; "Sanitary and Insanitary Methods of Plumbing Installation in a House"; "Sanitary and Insanitary Farm Barns and Yards"; "Sanitary and Insanitary Closets", and "Safe and Unsafe Wells". We have models of a combination cess-pool built in accordance with the State Building Code; sleeping porches; dolls equipped with braces showing various methods of treating bone and joint tuberculosis in children; and a Klondyke sleeping bed for out-door sleeping use. We have a series of striking electrical models which are as follows: "One in Five Baby Model", which points out the fact that one in every five babies born in the state dies before it reaches its second birth-day; "Dr. Fako's Consumption Cure", a bottle indicating the poisonous nature of so-called consumption cures; three electrical illusion models, one, contrasting a clean and dirty room; one, the dangers connected with the common drinking cup, and a death rate illusion showing the tremendous death rate from consumption in the United States. This is also shown by means of a death rate dial and bell so arranged that the hands of the dial move and the bell rings at regular intervals recording the death of individuals dying from tuberculosis. A continuous stereopticon lecture is provided by a stereomotorgraph, an automatic electric stereopticon which can be used in daylight as well as at night.

The total cost of the exhibit is approximately $5,000.00. It weights 9,000 pounds when packed ready for shipment. A baggage car is used for its transportation.

The plan of operating the exhibit has been to visit a city for one week under the auspices of a local organization interested in health or civic improvement. The hand-bills and window cards are sent on in advance of the time for the actual arrival of the exhibit in the city. The newspapers throughout the country are freely used in advertising the exhibit. Letters are written to leading public officials and private individuals directing their attention to the campaign and asking their co-operation.

The exhibit upon its arrival in a city is kept open to the publc afternoon and evening for six or seven days. Special advertising rulers and buttons are distributed freely to visitors as well as large quantities of public health literature. Each evening, a member of the staff of the State Board of Health delivers an illustrated lecture upon his special field of work. This is followed by a carefully selected motion picture film designed to reinforce the subject of the lecture. The program of lectures usually appears as follows:

LIMA EXHIBITION AND CAMPAIGN.

Monday, December 29, 1913 to Monday, January 5, 1914
Y. M. C. A. Building.

SCHEDULE OF LECTURES.

Monday, December 29, 1913, at 7:30 P. M.

Chairman — Dr. A. L. Jones, Health Officer.

E. F. McCampbell, Ph. D., M. D., Columbus, Secretary and Executive Officer, Ohio State Board of Health.

"Some Problems of Public Health Work in Ohio."
Film — On the Trail of the Germs.

Tuesday, December 30, 1913 at 7:30 P. M.

Chairman — Frank Maire, Pres. Lima Progressive Ass'n.
M. Z. Bair, Columbus, Assistant Engineer, Division of Engineering, Ohio State Board of Health.
"Public Water Supply, Sewerage and Waste Disposal."
Illustrated — 30 slides. Film — The Man Who Learned.

Wednesday, December 31, 1913, at 7:30 P. M.

Chairman — Dr. R. D. Kahle, Pres. Allen Co. Medical Ass'n.
Charles F. F. Campbell, Columbus, Executive Secretary, Ohio Commission for the Blind.
"Blindness and Its Prevention."
Illustrated — 75 slides. Film — Prevention of Blindness.

Friday, January 2, 1914, at 7:30 P. M.

Chairman — Prof. John Davison, Supt. Public Schools.
T. R. Brown, M. D., Columbus, Bacteriologist, Division of Hygienic Laboratories, Ohio State Board of Health.
"The Relation of the Hygienic Laboratory to Public Health."
Illustrated — 30 slides. Film — The Error of Omission.

Saturday, January 3, 1914, at 7:30 P. M.

Chairman — B. A. Gramm, Pres., Y. M. C. A.
E. R. Hayhurst, M. D., Columbus, Chief, Division of Occupational Diseases, Ohio State Board of Health.
"Occupational Diseases."
Illustrated — 30 slides. Film — The Visiting Nurse.

Monday, January 5, 1914, at 7:30 P. M.

Chairman — Dr. Josephine L. Pierce, Chairman, Health Committee, Federation of Women's Clubs.
R. G. Paterson, Ph..D, Columbus, Chief, Division of Tuberculosis, Ohio State Board of Health.
"What We Have Tried to Do in Lima."
Illustrated — 30 slides. Film — Hope.

We own eight motion picture films as follows:

The Visiting Nurse, 1,000 feet.
On the Trail of the Germs, 1,000 feet.
Hope, 1,000 feet.
Toothache, 1,000 feet.
Summer Babies, 569 feet.
The Error of Omission, 988 feet.
The Man Who Learned, 985 feet.
The Price of Human Lives, 1,000 feet.
Little Drops of Water, 818 feet.

The Ohio State Public Health Exhibit has been shown at the following places:

	Attendance
Ohio State Fair, September 1st to 5th, 1913	100,000
Marysville, September 17th to 24th, 1913	2,250
Marion, October 1st to 8th, 1913	802
Mansfield, October 11th to 21st, 1913	3,960
Wooster, October 28th to November 4th, 1913	3,000
Akron, November 10th to 17th, 1913	1,156
Painesville, November 22nd to 29th, 1913	2,175
Lorain, December 3rd to 10th, 1913	2,675
Sandusky, December 15th to 22nd, 1913	1,410
Lima, December 29th, 1913 to January 5th, 1914	985

We have had the closest possible co-operation from the Ohio Society for the Prevention of Tuberculosis, the Ohio Commission for the Blind, the Ohio State Dental Association in carrying out our campaign.

Within a reasonable time after the close of the exhibit we seek to bring about the organization of those individuals and societies that are interested in the movement in order to insure a continuance of well-directed effort against disease and insanitary conditions in the community.

5. *Tuberculosis Hospitals.*

Under the tuberculosis hospital law, which was materially amended by the Eightieth General Assembly (Laws of Ohio, 1913, Vol. 103, pp 492-495), certain powers of supervision and inspection of tuberculosis hospitals were imposed upon the State Board of Health. In addition to these duties, the Division has endeavored to create public opinion in those counties which have not made hospital provision for the care of tuberculosis cases.

Meetings of the county commissioners of Jefferson and Belmont counties were attended on August 6th, 20th, and October 29th, to discuss the union of these two counties for the purpose of building and maintaining a joint hospital.

An inspection was made on August 8th of the Rocky Glen Sanatorium for Tuberculosis at McConnelsville, a private institution proposing entering into contracts for the care of their tuberculosis cases with certain boards of county commissioners.

Increased attention will be given to this phase of the work during the coming year.

Plans for the standardization of the work of the hospitals that are new in operation are under way whereby a fair basis of comparison may be made as to the character of work being performed by the various institutions.

Robert G. Paterson,
Chief, Division of Tuberculosis.

REPORT

OF

SURVEY OF OCCUPATIONAL DISEASES

REPORT OF THE SURVEY OF OCCUPATIONAL DISEASES FOR THE YEAR 1913.

INCEPTION.

This Division of the State Board of Health began its work May 15th. 1913. and consequently the enclosed report is for the last seven and one-half months of the calendar year.

ORGANIZATION.

The personnel of the Division consists of one stenographer-clerk in addition to the Chief. The field work and various investigations have been carried on largely through the assistance of certain physicians, who have been selected because of qualifications. and have given services upon a part time basis since the 9th of June, 1913. There have been 7 of these field workers in total. 5 of whom worked on a salary basis of $100.00 per month and their necessary expenses; and 1 upon a basis of $5.00 per day and expenses.

SCOPE.

To come within the requirements of the Occupational Disease Statute and the policy of the State Board of Health. the scope of the work has been under 3 heads. (1) the investigation of industrial hygiene, (2) the collection and summarizing of occupational disease cases. and (3) publicity.

(1) *Investigation of Industrial Hygiene.* Establishments as follows:

Automobiles	16
Brass	51
Breweries	8
Brick, marble and stone	17
Canning	1
Cash Registers	4
Caskets and vaults	7
Chemicals	1
Cars	3
Cigars	11
Dry cleaning	8
Enameling	6
Engraving	6
Electrical goods	16
Extracts	5
Fertilizers	10
Flour	1

Furniture	13
Furriers	2
Galvanizing	4
Gas mfg.	1
Glass and glassware	41
Hats (re-blocking)	1
Ice	3
Implements	7
Iron and steel products	23
Jewelry	2
Laundries	37
Lead	1
Lead shot	1
Lead (white)	2
Machinery and tools	50
Oil cloth	2
Paper and stationery	4
Paint and varnish	45
Pianos	1
Plating	6
Plumbing supplies	17
Pottery	2
Printing	32
Regalia	2
Railroad shops	2
Rubber	1
Safes and locks	2
Scrap metal (junk)	13
Scales	3
Sheet metal	2
Shipbuilding	3
Shoes	18
Soap	3
Springs and mattresses	3
Springs and axles	4
Storage batteries	7
Stoves	10
Tanning	4
Textiles	2
Tin cans	2
Toys	3
Twine	1

Vehicles	51
Waste	1
Wax	1
Welding	9
Wire fencing	2

Establishments investigated — total	608
Total employes	123,871
Total in health-hazardous processes	56,620

(2) *Collection and Summarizing of Occupational Disease Cases.*

Dermatitis	13
Amblyopia	2
Conjunctivitis	3
Siderosis	12
Rheumatism	2
Turpentine	3
Gas psychosis	2
Anemia fatigue	2
Hydrofluoric acid	1
Rhinitis	8
Benzine	7
Flat foot	2
Heat prostrations	3
Bronchitis	18
Brass	60
Lead poisoning	226
Deafness (noise)	2
Tobacco	1
Antimony	1
Total cases	368

Occupational Disease cases reported by:

	(a) *Private physicians*	(b) *Hospitals, Dispensaries, Factories.*
September	15	74
October	16	77
November	4	26
December	4	..
Total	39	177*

(3) *Publicity.*

This has consisted in a series of articles upon industrial hygiene and occupational diseases, which have been published in the Monthly Bulletin, beginning with June, 1913. Reprints of the more important of these articles have been made. All physicans in the State whose addresses could be secured (about 7500) have been sent certain of these reprints, along with reporting blanks for occupational disease cases. In addition, some pamphlets which have not appeared in the Bulletin, such as, "Laws of Ohio Relating to Occupational Diseases and Industrial Hygiene", and leaflets upon industrial hygiene have been prepared separately from the Bulletin publications, and distributed to manufacturers' associations and individuals upon request.

The Public Health Exhibit includes a section upon the subject of occupational diseases. In conjunction with the Exhibit, lectures upon the subject have been given by the Chief of the Division in various cities of the State.

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* Of these 177 cases, 111 were cases of lead poisoning in past 2½ years.

FINANCIAL STATEMENT.

Appropriation for the year 1913	$7,000 00
Expenditures May 15 to December 31, 1913:	
(1) Field investigations	3,162 00
(2) Salary of the Chief	1,875 00
(3) Stenographic	484 23
(4) Postage (Publicity)	141 07
(5) Office equipment	187 93
Total	$5,850 43
Balance on hand for use until February 15th, 1914	1,149 57
	$7,000 00

(Sgned) E. R. HAYHURST, A. M., M. D.,
Chief, Survey of Occupational Diseases.

REPORT

OF

Division of Plumbing Inspection

ANNUAL REPORT.

I have the honor to present the following report for the year ending December 31, 1913.

Plumbing inspection is to view critically the plumbing and drainage system of a building in order to ascertain if the fixture, device or construction is in accord with good practice and sanitary law. It is the supervision of the location of the plumbing fixture, its kind and surroundings, and the method of connecting the drainage system.

Plumbing inspection may be divided into two classes.

1st. The inspection of new plumbing in old or new buildings.

2nd. The inspection of old plumbing in old buildings that has deteriorated, from the natural elements, abuse and ignorance.

Both are very important, but the second is receiving very little attention for the reason that the plumbing inspectors' time is entirely taken up inspecting new installation, and the lack of proper assistace makes it physically impossible for either state or local inspectors to take up this work, which in most instances is being neglected.

In our larger cities, namely: Cleveland, Cincinnati, Columbus and Toledo, plumbing inspection departments are connected with building inspection departments as required by Section 4420 of the General Code.

The plumbing and drainage of buildings is not strictly a requirement affecting the safety of the walls, carrying weight or fire hazard, but it does directly affect the comfort, convenience and the moral and physical health of the occupants. The installation and supervision should be from a health and not a building construction standpoint.

More efficient and effective work and better service could be rendered in these cities, if the plumbing inspection was under the supervision of the board of health or health commissioner.

Plumbing fixtures are the points of entry or the source of sewage which is composed of human excrement and urine, domestic and industrial wastes, which represent the greatest hazard to man and are the most productive sources of disease. These wastes were formerly disposed of in privies, cesspools, over the back fence or into the public gutter.

It is of first importance to health, for houses both in town and country, that all filth should be removed as speedily as possible and disposed of in such a manner as to cease to be injurious to mankind. The basic principle of sanitation and healthfulness is cleanliness and the plumbing fixtures provide a means of cleansing the person and apparel.

The cleanliness of the body is simplified by the bath tub and shower bath. The cleanliness of the apparel is simplified by the laundry trays.

The sanitary condition of the kitchen and the cleanliness of food is in a great measure dependable upon the kitchen sink, and the modern vitreous porcelain water closet is the safest measure of removing human excrement and urine.

Every time a study is made in any city of sickness and crime, it will be found that the plague spots are both grouped right around the places where the housing conditions, the result of insanitary and faulty plumbing, are bad.

There is without question a close relationship between faulty plumbing on one hand, and disease on the other.

The safety of the plumbing fixture depends upon the removal of the wastes and the proper construction of the drainage pipes through which they pass.

The house drain,, soil, waste and vent pipes of a plumbing and drainage system are placed beneath floors and in walls and partitions, usually in comparatively inaccessible places, and the water seal in most fixture traps is invisible.

It is obvious that in the absence of regulation and inspection, lack of knowledge and reckless competition develop a class of material and construction that is unfavorable to the health of a community and insanitary conditions are sure to result if each person is permitted to install a plumbing system according to his own ideas.

Preventive medicine is knowledge anticipating and intercepting disease, and forestalling the use of medicine, and the correction of insanitary conditions through the agency of plumbing inspection must be granted a place of prominence among the methods inaugurated for the protection of public health.

In the betterment of the social, physical and moral wellbeing of society, its importance is a factor in preventive medicine.

REVISION OF STATE PLUMBING CODE.

In compliance with the instructions of the State Board of Health at a meeting held under date of November 5, 1912,

> "that the State Inspector of Plumbing devote as much time as is necessary in the immediate future to the satisfactory compilation of that part of the State Building Code relating to plumbing",

circular letters were sent to the various building inspectors, board of health, plumbing inspectors, architects and plumbers, soliciting recommendations and criticism with the view of general co-operation. In a subsequent letter the Ohio State Building Code Commission advised that all suggestions and criticisms to Part 4, Sanitation, be submitted to the State Inspector of Plumbing.

For the purpose of hearing arguments upon the proposed amendments, a conference was held in the Public Service Commission Hearing

Room in the State House, January 2nd and 3rd, at which were present persons representing boards of health, building inspection departments, plumbing inspectors, plumbers, and the consulting architect of the Ohio State Building Code Commission.

The synopsis of this conference was submitted to Secretary and Executive Officer of the State Board of Health under date of January 8, 1913.

Further hearings and conferences were held, and the revisions compiled were submitted to the State Board of Health with the following result.

COLUMBUS, OHIO, July 26, 1913.

MR. WM. C. GROENIGER,
State Inspector of Plumbing,
Columbus, Ohio.

DEAR SIR: — At the meeting of the State Board of Health held July 23, 1913, I presented the plumbing regulations which you requested the Board to adopt as Rules and Regulations.

You are hereby notified that said regulations are adopted as *Rules and Regulations of the State Board of Health.

Yours very truly,
(Signed) E. F. MCCAMPBELL,
Secretary.

The action of the Board eliminated the necessity of the Building Inspection Departments enforcing two separate codes and created a minimum standard state law for all buildings in Ohio.

Ten thousand copies were printed and distributed throughout the State, and with few exceptions it has met with general approval.

It has been impossible, however, to convince the authorities in many of our larger cities that the requirements of Part 4, Sanitation, are effective in their cities and that the substitution of a fixture, device or construction can only be made when acting in conjunction with the State Board of Health. This attitude is maintained in defiance of opinions of the Attorney General upon the law.

REPORT ON THE CONDITION OF THE SEWERAGE SYSTEM, LOCATION OF TEMPORARY PUBLIC COMFORT STATIONS, AND HOUSE TO HOUSE INSPECTION AT DAYTON DURING AND IMMEDIATELY FOLLOWING THE FLOOD OF MARCH, 1913.

COLUMBUS, OHIO, May 24, 1913.

To DR. E. F. MCCAMPBELL,
Secretary and Executive Officer.
State Board of Health.

DEAR SIR: — In compliance with your instruction the State Inspector of Plumbing proceeded to Dayton on March 28th, and with the exception of a few days remained until April 27th, for the purpose of assisting in re-establishing sanitary conditions.

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* Printed in report of Meeting July 23, 1913.

Reporting to Mr. M. Z. Bair, Principal Assistant Engineer, I was directed to co-operate with the city officials and secure the openings of all sewers as quickly as possible, and later continued this work under the direction of Dr. E. F. McCampbell, Superintendent of Sanitation, acting in co-operation with Major Thomas L. Rhoads, U. S. Army, Chief Sanitary Officer.

NORMAL SEWERAGE CONDITIONS.

The drainage facilities of the city of Dayton are afforded by approximately 200 miles of storm and sanitary sewers constructed on the separate plan. Records of the number of connections to the sewers indicate that about 90% of the population is tributary thereto. The sewerage system is divided into ten main sewer districts, many of which are sub-divided into smaller districts. The general topography of Dayton is rather flat and for this reason many of the sewers are not provided with the most suitable grades. It is estimated that the average daily sewage flow under normal conditions is eighteen million (18,000,000) gallons.

SIZE AND LOCATION OF SANITARY AND STORM WATER SEWER VALVES NUMBERED IN ORDER IN WHICH THEY ARE CLOSED.

No. 1.

Sixty (60) inch valve on the west side of the Miami River north of the railroad bridge.

No. 2.

Thirty-six (36) by forty-eight (48) inch valve on the west side of the Miami River south of the Fifth St. bridge.

No. 3.

Twenty-four (24) inch valve on the east side of the Miami River at the head of Maple St.

No. 4.

Seventy-two (72) inch valve on the east side of the Miami River at the Herman Ave. Bridge. The Herman Ave. or North Dayton Pumping Station.

No. 5.

Thirty-six (36) inch valve on the east side of the Miami River at Third St. and Robert Boulevard.

No. 6.

Eighteen (18) inch valve west side of the Miami River at Beech and St. Francis Ave. St. Francis Pumping Station.

No. 7.

Twenty-four (24) inch valve east side of the Miami River at First and Robert Boulevard.

NOTE: All of the foregoing valves must be closed at a stage of 10′ 8″.

No. 8.

Forty-two (42) inch valve east side of the Miami River at the foot of Longworth St. Longworth Pumping Station for sanitary sewage.

No. 9.

Twenty-four (24) inch valve south side of Miami River on Lawrence Street at the Levee.

No. 10.

Fifteen (15) inch valve north side of the Miami River at Main and Emmett Streets.

No. 11.

Ninety (90) inch valve north side of the Miami River, corner Lehman and Forest Ave. Lehman St. Pumping Station.

NOTE: Primarily a storm sewer can be by-passed to the sanitary sewer.

No. 12.

Twenty-four (24) inch valve west side of the Miami River 150 feet west of the Third St. Bridge.

No. 13.

Fifty-one (51) inch valve north side of Mad River on the levee 500 feet east of Ohio Street.

No. 14.

Eighteen (18) inch valve north side of Mad River 100 feet west of Light St.

No. 15.

Twenty-four (24) inch valve north side of Mad River 20 feet west of Keowee St. on concrete wall.

No. 16.

Forty-eight (48) inch valve south side of Wolf Creek at Sweetman St. and the levee.

No. 17.

Seventy-two (72) inch valve east side of Miami River at the bend in the river 1300 feet south of Washington St. bridge.

No. 18.

Ninety-six (96) inch valve east side of the Miami River 400 feet west of the southern end of Perry St. Seeleys Ditch.

No. 19.

Forty-eight (48) inch valve east side of Miami River in Apple St. 20 feet east of the Canal Bridge closed 17 feet.

No. 20.

Thirty-six (36) inch valve south side of Miami River north end of Wilkinson St. and the Levee.

No. 21.

Eighteen (18) inch valve south side of the Miami River at Main St. Engine House, Main and Monument Ave.

No. 22.

Eighteen (18) inch valve south side of Miami River at Jefferson and Monument.

No. 23.

Eighteen (18) inch valve south side of Miami River in Van Cleave Park opposite St. Clair St.

No. 24.

Twelve (12) inch valve west side of Miami River Sunset Ave. 300 feet south of First Ave.

No. 25.

Twelve (12) inch valve east side of Miami River Sunset Ave. 300 feet north of Third St.

No. 26.

Eighteen (18) inch valve south side of Wolf Creek at Blaine and Dale Ave.

In addition to the foregoing the storm sewers discharged at many points along the canal and hydraulic. These sewers are laid on flat grades with outlets provided at the most convenient points. With few exceptions none of the storm sewers are used for sanitary purposes.

PUMPING STATIONS.

Owing to the wide fluctuations in the water levels in the River it is necessary to pump a large part of the sewage whenever the river reaches an eleven foot stage. At this stage and without pumping much of the sewage backs into the sewers with consequent damage to property.

Pumping Stations operated by single stage, centrifugal pumps, directly connected to electric motors are maintained at

Longworth St.
St. Francis Ave.
Lehman St.
Herman Ave.

The pumping capacity at all these stations is ample to discharge the maximum flow from sewers under normal conditions. All the sewer outlets extend well into the channels of the river and are submerged below the mean low stages.

Sewage Ejectors operated by air furnished from the water works pumping station are maintained at

Floral Ave. and Lehman St.
North end of Webster St. bridge.

EXISTING CONDITIONS.

Investigation indicated that the sewerage system was not as seriously affected as was supposed, the greatest damage being confined to the sewage pumping stations, in all of which the pumps, motors and electrical apparatus were submerged, and to the breaks in the air lines operating the Webster St. and Floral Ave. ejectors.

It was evident that the entire electrical apparatus located in the four pumping stations would require a thorough cleaning and drying, that the wires be replaced before these could be operated, and that the broken air lines in the levee washouts west of Keowee St. and the air lines carried out by the Webster St. bridge would have to be repaired and replaced before the ejectors could be operated.

Investigations also showed that there were more than two thousand catch basins in the flooded zone clogged with debris, muck and gravel that would require immediate attention, and that all manholes would have to be examined to ascertain if the dust pans had been dislodged. Outlets from many of the valves were badly clogged preventing a free gravity flow, and required immediate attention. Many valve stems were bent and twisted making them inoperative.

Immediate Remedial Action Necessary.

It became obvious that with the sewage pumping stations and ejectors inoperative the greatest danger would arise, should the river again reach the 11 foot stage. At this stage it would be necessary to close the flood valves, and with the pumps and ejectors inoperative, the sewage would back into the sewers and cellars.. This would not only delay the work of draining and cleaning cellars, but make it impossible to operate many power plants, where boiler and engine rooms are located in the cellar. It would also mean that all work accomplished along these lines would have to be done over.

The damage done to the sewage pumping stations and ejectors will be discussed in detail.

The Longworth Street Pumping Station.

This station is tributary to the main portion of the city, also the eastern and southern section, and accommodates the sanitary sewage. The three, 50 horse power, 230 volt motors, and the entire electrical equipment were submerged, and the wires were down. Employes of the National Cash Register Company baked these motors, greatly assisting in placing this station in operation.

On Friday, April 4th, the river again reached the 11 foot stage, and the danger previously outlined became a reality. Superintendent Hutchison of the Dayton Lighting Company was appealed to, and immediately detailed a force of men to string wires, and repair the station, and at six o'clock the same evening succeeded in operating the number one and two pumps until the danger had passed. Investigation showed that number 3 motor was dead grounded due to cause other than water.

Lehman Street Pumping Station.

This station accommodates the storm water in the southern portions of Riverdale, and eastern portion of Dayton View. The two, 50 horse power, 2300 volt motors, and the entire electrical apparatus was submerged, and the wires were down. The 90 inch valve on the gravity flow line was put out of commission. The valve stem was twisted, and a machinist was detailed to raise this gate with chain blocks to relieve this portion of the city. Men were detailed, and the plumbers' furnaces used to bake these motors, and with the assistance of the electricians from the Dayton Lighting Company this station was again placed in commission Saturday, April 26th.

St. Francis Avenue Station

This station provides for the sanitary sewers of the west side and Edgemont. The area is rather large and the station is severely taxed under normal conditions. A very strong current in the river resulting from the high waters at the time of the flood carried away the outlet from the pumps, destroyed two manholes, and later deposited a large quantity of debris directly over the gravity flow line, thus preventing drainage from this point, and causing the sewage to back into the cellars. The work of re-establishing drainage at this station was seriously interfered with owing to the fact that the damage to the low water line was submerged. Dynamite had to be resorted to, and a force of men were engaged, excavating and re-establishing drainage, and the territories tributary were greatly relieved from the damaging effects of back water. The stone pipe outlet from the station was replaced with iron pipe, the manholes rebuilt, and the stoppage in the gravity line removed. All emergency measures possible were taken at this station in order that it might be placed in temporary service. The two, 20 horse power motors, and the entire electrical apparatus were submerged, and the wires carried away. These motors were baked. The station was operated a short time, but upon the advice of an expert electrician that it was dangerous, it was discontinued until such time as a more thorough examination could be made of the entire electrical equipment.

Herman Avenue Pumping Station.

This station accommodates the storm water from a large portion of North Dayton. The two, 50 horse power, 2300 induction motors, and the entire electrical equipment were submerged. The wires leading to this station were carried away, and the outlet of the gravity flow line was badly clogged. These motors were baked, the electrical equipment repaired, and this station was again put into commission Thursday, April 24th.

A report showing the conditions of the various pumping stations and the necessary repairs required at each, embodying a bill of materials, was prepared and placed in the hands of the Director of Public Service, urging him to take immediate steps towards carrying out the suggested improvement.

The Webster Street Ejectors.

These ejectors accommodate the sanitary sewage from North Dayton and are operated by air furnished through a 5 inch line from the Water Works Pumping Station. This line is carried along the south levee of the Mad River from the pumping station to the Webster Street bridge, and across the bridge to the ejectors. Several breaks in this line, and the carrying away of part of it by the washing away of the Webster Street bridge put these ejectors out of commission. A force of men from the Water Works department repaired the breaks in the levee, and put in a temporary 2 inch line on a cable across the Mad River on the Webster Street bridge abutments. It was found that this 2 inch line did not furnish sufficient volume of air to operate both ejectors, which was remedied by placing an intermediate or storage tank into the ejector pits, the same being pumped out by the fire department. The ejectors were again put in operation Thursday, April 17th, and the condition in North Dayton relieved.

Floral Avenue and Lehman Street Ejectors.

These ejectors accommodate the sanitary sewage from Riverdale which operate by air furnished through a line from the water works pumping station. These ejector pits were pumped out by the fire department, the breaks in the air line repaired, the ejectors operated on Friday, April 11th, and the conditions in southern Riverdale relieved.

Catch Basins.

For the purpose of cleaning catch basins, the flooded zone was divided into seven districts as follows:

District No. 1.

From the east line of Main Street south to the canal and west to the river.

District No. 2.

Seeley Ditch and tributaries.

District No. 3.

Flooded parts of North Dayton.

District No. 4.

Riverdale north to McOwen Street west to Forest Avenue.

District No. 5.

West Side: — South of River Street and west of Ferguson Avenue sewers east of Summit and north of Third Street.

District No. 6.

West Side: — South of Third Street and east of Summit bounded on the south by Germantown and Washington Streets.

District No. 7.

West Side: — From Germantown and Washington Streets on the north, Broadway on the west to the corporation line on the south.

These districts were sub-divided and a force of men engaged in cleaning catch basins, and by April 14th approximately twenty-one hundred (2100) basins had been cleaned and the stoppages in manholes removed. Other forces of men were engaged in repairing valves, removing debris from the outlets, baking motors, repairing ejectors, and working at the pumping stations.

CONDITIONS ON LEAVING.

On Saturday, April the 26th, all the pumping stations and ejectors could be operated, and with the exception of several street mains which would require attention, the conditions were approximately normal. The work of Mr. Jos. Madigan and Mr. James Dowling, Assistant Superintendents of Sewers was commendable, and to these men should be given the credit of accomplishing the rehabilitation of the sewerage system and pumping stations in so short a time.

TEMPORARY PUBLIC COMFORT STATIONS.

The temporary inoperativeness of the toilets in residences, hotels, department stores, etc., and the washing away of many privies made it necessary that some relief be afforded until such time as these toilet rooms could be rehabilitated. A force of carpenters at the National Cash Register Company built one hundred and two frame privies which were distributed and placed over manholes in the streets throughout the entire flooded zone, and a man detailed to keep them in a sanitary condition.

HOUSE TO HOUSE INSPECTIONS, APRIL 3-23 INCLUSIVE.

It became obvious that the plumbing in buildings throughout the flooded zone was badly damaged. Water and gas pipes were broken off and fixtures clogged with debris and mud. A force of plumbing inspectors was organized, with the City Plumbing Inspector, Mr. Wm. J. Yackley in charge. These men were detailed to co-operate with the 17 district sanitary officers, and given the following instructions:

INSTRUCTIONS.

1st. Investigate each and every building and premises.
2nd. Note if the house and cellar have been cleaned.
3rd. Note if there are water closets in the building, either in basement, on the first floor, or upper floor if any. Note their condition, and if they are in working order.
4th. Where water closets were stopped with sediment, force same.
5th. Note if there are frost proof closets or privy vaults in the yard, and their condition.
6th. Report if buildings are occupied or empty.

7th. Report water and gas leaks whether on premises, in buildings or in the thoroughfares. In the event that water or gas leaks are found in buildings, shut off the water and gas at the service stops.

8th. Report the condition of all buildings inspected daily in writing to the Plumbing Inspection Department.

An itemized report was compiled daily, embodying the general condition of each building inspected, giving the street number and the owner's name, and submitted to Dr. E. F. McCampbell, Superintendent of Sanitation.

These inspections brought out the facts that there were thousands of privy vaults located on property that was accessible to the sanitary sewers. For the purpose of recording the location of each privy vault on premises accessible to the city sewers, a map of the city was utilized, and a black headed pin inserted at about the location of each vault. This map also demonstrated that there were hundreds of privy vaults existing on premises in which the building was provided with sanitary appliances, and connected to the sanitary sewers, the owners having failed to have the same cleaned, and properly filled with ashes or earth.

SUMMARY OF INSPECTIONS.

Eight thousand two hundred and eighty (8,280) inspections were made in twenty-one days.

Two thousand (2,000) privies were washed away leaving open vaults.

One thousand (1,000) premises had both privy vaults and sanitary sewer connections.

Three thousand four hundred and forty-eight (3,448) privy vaults are located on premises accessible to the city sewers.

In addition to the above, thousands of water closets were repaired and placed in operation, and gas and water leaks reported, which proved to be of material assistance in the work of cleaning the city.

RECOMMENDATIONS.

The result of these inspections brought out an existing condition that was unknown to the local health authorities. In order to correct this condition I would recommend that the following section of the State Code be adopted and enforced by the local health board:

TITLE 18.

Vaults.

SECTION 1. (Privy vaults permitted.) Privy vaults may be constructed only on premises where water and sewers are not accessible.

SECTION 2. (Privy vaults prohibited.) Privy vaults shall not be constructed where a sewerage system is available, nor on any lot where in cleaning, the night soil would have to be carried through any building of human habitation, nor shall any old vault be connected to a sewer.

Vaults now existing on premises accessible to a sewer shall be cleaned to the bottoms and filled with ashes or earth.

SECTION 3. (Location of vault.) No vault, manure pit, open top cesspool, septic tank or other reservoir which is used as a privy or receptacle for human or animal excreta shall be located within two (2) feet of any lot or alley line or twenty feet of any street line or any building of human habitation or occupancy or within fifty (50) feet of any cistern, well, spring or other source of water supply used for drinking or culinary purposes, whether they are located on the same or adjoining lot, or premises.

Exception. No privy vault shall be located within fifty (50) feet of any school building.

SECTION 4. (Construction of vaults.) All vaults, pits or other open top reservoirs described in section 3 shall be made of either brick or concrete. The wall of such vaults, if made of brick, shall be of hard burned sewer brick, not less than eight inches thick, laid in Portland cement mortar and the walls plastered outside and inside with a half inch coat of Portland cement mortar, in proportion of one part Portland cement and two parts of clean sharp sand. After this coating is put on it shall be given one coat wash of liquid Portland cement. The bottom shall be at least three brick course laid in cement mortar, or of Portland cement concrete mortar eight inches thick.

When Portland cement concrete is used to construct vaults, the walls shall be at least six inches thick, laid to a form, and the concrete shall be made of one part of live Portland cement, three parts of clean, sharp sand, five parts crushed stone, free from dust and of sizes between one-quarter and one and one-half inches in largest diameter, and shall be plastered and grouted inside and out as prescribed above for brick construction.

Vaults shall be made tight and their walls continued twelve (12) inches above the ground surface to prevent surface drainage. No retempered cement shall be used.

If the vault is used in connection with an outhouse, the vaults shall be of such shape and size as not to extend under any portion of the floor of said outhouse but only under the space occupied by the seats. Any portion of the vault extending beyond the walls of the outhouse shall be covered by a four (4) inch brick arch, four (4) inch stone flagging, re-enforced concrete slab or cast iron.

SECTION 5. (Outhouse.) Over each privy vault, which shall receive nothing but human excreta, there shall be placed an outhouse constructed as prescribed in title 12, section 3.

The seats shall be provided with tight fitting covers, and the space underneath shall be ventilated by a vent pipe or box extending upward through and three (3) feet above the roof. Such vent pipe shall be at least six (6) inches square for every square yard or part thereof of vault surface.

SECTION 6. (Cleanout doors.) Vaults shall be provided with a cleanout extension not less than two (2) by one and one-half (1½) feet in size, connecting directly with the vault.

Cleanout shall be provided with a trap door the full size of the cleanout. Cleanout extension shall extend at least one (1) foot above the grade line.

SECTION 7. (Floors.) Floors of outhouses shall be made as tight as possible.

SECTION 8. (Outhouses for different sexes.) Where outhouses are provided for the different sexes, if located within forty (40) feet of each other, the walks or approaches thereto shall be separated by a tight fence, at least six (6) feet high, but in no case shall such outhouses be located within ten (10) feet of each other.

I would further recommend that the system of placing the inspection of the privy vaults in charge of a district sanitary policeman be abandoned, and this entire proposition be placed in the hands of the Chief Inspector of Plumbing. He to be directed to complete the work started which will give the exact location, and a record of every existing privy vault in the city. It is obvious that this will require additional deputy inspectors, but this inspection can be completed at a cost of less than ten cents (10c) per building.

Plumbing inspection, the abatement of the privy nuisance, and the installation of sanitary plumbing fixtures being so closely related prompts this recommendation.

Respectfully submitted,

(Signed) WM. C. GROENIGER,

State Inspector of Plumbing.

INSPECTION OF NEW STATE BUILDINGS.

Ohio State University — Horticultural Building	Columbus
Ohio State University — Archaeological Building	Columbus
Ohio State University — Botany Building	Columbus
State Normal School — Dormitory	Bowling Green
State Normal School — Administration Building	Bowling Green
Ohio University — Training School	Athens
Womens' Reformatory	Marysville
Armory	Marion
Armory	Sidney

INSPECTION OF EXTENSION WORK ON STATE BUILDINGS.

Miami University — Boarding Dept., Main Building	Oxford
Miami University — Women's Dormitory	Oxford
Normal College Building.	
Auditorium.	

INSPECTION OF NEW COUNTY BUILDINGS.

Holmes County Children's Home	Millersburg
Huron County Children's Home	Norwalk
Champaign County Infirmary Hospital	Urbana
Columbiana, Mahoning, Portage, Stark and Summit County Tuberculosis Hospital	Springfield Lake

INSPECTION OF NEW WORK IN OLD COUNTY BUILDINGS.

Butler County Court House	Hamilton
Paulding County Court House	Paulding
Richland County Jail	Mansfield
Allen County Infirmary	Lima
Lorain County Infirmary	Elyria

INSPECTION OF OLD BUILDINGS.

Allen County Infirmary.

This institute is located three miles east of Lima, on the Ada Pike.

The plumbing consists of 9 water closets; 2 sinks; 1 urinal; 7 wash basins; 3 bath tubs, and 5 laundry trays, making a total of 27 plumbing fixtures and 2 outside privy vaults.

The house drain consists of stone pipe, and the sewage discharges into Hog Creek.

Existing Conditions.

The sanitary condition of the plumbing is fair, excepting that which is in the Jail House which is very poor. There are three open sewer connections in the Milk Room; 1 in the Jail House, and 1 to receive the waste from the Boiler Room.

The two outside privy vaults are in very bad condition. The fixtures in the men's department, second floor toilet room are corroded, many of the water closet tanks are inoperative. The soil vent stack in the Main Building from the third floor through the roof is of sheet iron. The wash stand trap in the main sitting room is in bad condition.

Recommendations.

In view of the existing insanitary conditions I would respectfully recommend—

That floor drains be installed in the Milk Room, Jail House, and the Boiler Room in place of the open sewer connection.

That the two outside privy vaults be abandoned, cleaned and filled with dry earth or ashes. With sanitary conveniences in the buildings these privy vaults are unnecessary.

That the plumbing in the Jail House be overhauled and placed in a sanitary condition.

That the plumbing fixtures be repaired, placed in working order, and kept free from corrosion.

That the sheet iron soil vent stack be replaced with iron soil pipe.

That the wash-stand in the main Sitting Room be replaced by a new one.

The State Board of Health approved the foregoing recommendations. The Allen County Commissioners were notified and they informed us that the recommendations would be carried out.

WAPAKONETA CITY BUILDING.

This City Building is located on Willipie St., Wapakoneta, Ohio.

The plumbing consists of 4 hopper water closets; 2 lavatories; 1 copper bath tub, making a total of 7 plumbing fixtures in this building.

The house drain consists of iron and stone pipe, and the sewage discharges into the city sewerage system.

Existing conditions.

The sanitary condition of the plumbing is poor.

The four hopper closets are corroded, have a great amount of fouling surface, and are flushed with wheel handle valves, which makes the flush very inadequate and uncertain. The ventilation of the two cell blocks and tramp room is very poor.

Recommendations.

In view of the existing insanitary condition I would respectfully recommend —

That the plumbing in this building be overhauled and placed in a sanitary condition.

That the four hopper closets be replaced by siphon jet or siphonic closets with seat action valves which will guarantee that each closet will be thoroughly flushed.

That a system of gravity or mechanical ventilation be installed which will change the air in these cell blocks at least six times an hour.

The State Board of Health approved the foregoing recommendations. The Mayor of Wapakoneta was notified, and he informed us that the changes in the plumbing would be made when the building is remodeled.

Defiance County Court House.

Men's Toilet Room in Basement.

The men's toilet room is located in the basement of the Defiance County Court House, Defiance, Ohio.

The plumbing consists of a three compartment range closet and urinal trough.

Existing conditions.

The sanitary condition of the plumbing in this room is very poor.

The fixtures are corroded making it impossible to keep them clean; the room is very poorly ventilated, and the odor can easily be detected on the first floor.

Recommendations.

In view of the existing insanitary conditions I would respectfully recommend—

That the plumbing in this toilet room be overhauled, new sanitary fixtures be installed, and a system of ventilation be provided that will change the air in this room at least six times an hour.

Remarks.

A six inch opening for sewer and trap ventilation was provided for when the ladies' toilet room was installed. The vent flue now serving the ladies' toilet room can also be used to serve this room.

The State Board of Health approved the forgoing recommendations. The Defiance County Commissioners were notified, but failed to comply e, on October 15, 1913 this matterwith the recommendations therefor was taken up at a meeting of the State Board of Health with the result that it was referred to the Attorney General for prosecution under Sections 1261-13, 1261-14, and 1261-15 General Code. The Department was notified through the Attorney General's office by the Prosecuting Attorney of Defiance County, that the recommendations would be complied with in March or April 1914.

Franklin County Infirmary.

This institution is located two and one-half miles southeast of Columbus on the Infirmary Road.

The plumbing consists of 42 water closets; 25 bath tubs; 8 lavatories; 6 slop sinks; 7 urinals; 19 sinks; 6 wash troughs; 3 shower baths, making a total of 116 plumbing fixtures distributed over the Administration building. Men's Hospital, Woman's Hospital, Syphilitic Ward. Tuberculosis Ward. Men's Lodge Building, and Tuberculosis Camp.

The house drain consists of iron and stone pipe and the sewage discharges into a cesspool which overflows into Alum Creek.

Existing Conditions.

The sanitary condition of the plumbing in general is poor.

Fixtures are corroded making it impossible to keep them clean. A majority of the water closets are of the washout pattern, having a great amount of fouling surface. The toilet rooms are poorly ventilated, and have wood floors.

Administration Building.

Men's Department, 1st Floor.

Fixtures are covered with corrosion, the odor is very bad, and has an open sewer connection at the urinal. The wash trough is in fair condition.

2nd. Floor.

The wash trough is in fair condition, but the fixtures are covered with corrosion, and the odor is very bad.

3rd Floor.

The six inch soil pipe is broken leaving an open sewer connection, fixtures are corroded, and the odor is very bad.

Administration Toilet Rooms.

The toilet rooms and plumbing fixtures in the Main or Administration building, located on the second, third and fourth floors are in good condition, the rooms and fixtures are clean.

Main Building — Women.

1st Floor Toilet Room.

The 3 water closets, 2 bath tubs, and 3 sinks in this toilet room are very foul, the fixtures are covered with corrosion and the ventilation is very poor.

2nd. Floor Toilet Room.

The bath tub, slop sink, 2 water closets and 2 wash troughs are very foul, and covered with corrosion. The ventilation is poor.

Sewing Room.

The bath tub, wash-stand and water closets are fair.

3rd. Floor Toilet Room.

The bath tub, slop sink, 2 water closets and 2 wash troughs are foul and covered with corrosion. The ventilation is poor.

Nursery.

The sink in this room is in very bad condition, the water closet and bath tub are fair.

Kitchen.

The general ice box waste empties into a floor drain which discharges into a seep basin in the yard.

The five kitchen sinks are in fair condition, but the traps are not ventilated.

Floor drains are provided to receive the scrub water, etc.

Kitchen Employes Bath Room.

This bath room, located on the first floor at the north end of the main hall is not provided with any means of ventilation, requires artificial light, and the fixtures are corroded with unventilated traps.

Men's Hospital.

1st Floor.

The fixtures in this toilet room are covered with corrosion, and the room poorly ventilated.

2nd. Floor.

The bath tub, sink, urinal and two water closets in this room are foul, covered with corrosion and the ventilation is poor.

Nurses Bath Room.

The fixtures in this room are in fair condition, and the room neat and clean.

Syphilitic Ward.

The water closet and bath tub in this room are very foul and the ventilation poor.

Tuberculosis Ward.

The sink in this room is not trapped, the bath tub and water closet are in bad condition, and the ventilation is very poor. The bath room is partitioned off from this ward by a seven foot partition, having no windows or means of ventilation.

Men's Lodge Building.

1st Floor.

The urinal, sink and two water closets in this room are very foul, and the ventilation very poor.

2nd. Floor.

The bath tub and two water closets in this room are very foul, and the ventilation very poor.

Women's Hospital.

1st Floor.

The bath tub and water closet are in very poor condition and the vent opening of the kitchen sink trap is plugged with a wooden plug.

2nd. Floor.

The bath tub, 2 water closets and 2 wash basins are foul, covered with corrosion and the ventilation poor.

Nurses Bath Room.

The bath tub and water closets are in good condition and the room neat and clean.

Old Women's Hospital.

The bath tub and closet in this room are very foul, the sink is in fair condition.

Tuberculosis Camp.

The 2 water closets, 3 shower baths and 3 sinks in this camp are in good condition.

Drainage System.

With few exceptions the soil and vent pipe stacks are in fair condition, but the house drain is not provided with the proper cleanouts, and has many open sewer connections.

Water Supply.

The water from this institution is supplied from wells, containing considerable iron which readily permits a corrosion to cover the vitrified enamel iron plumbing fixtures.

This is to be overcome by piping the Columbus city water to this instiution.

Recommendations.

In view of the existing insanitary conditions, I would respectfully recommend—

That the entire plumbing and drainage system, (excepting the Tuberculosis Camp and Administration Building toilet rooms,) be overhauled and placed in a good sanitary condition.

That the fixtures covered with corrosion be cleaned or replaced by ones of a modern pattern.

That the vitrified enamel iron washout water closet bowls be replaced by vitrified porcelain enamel syphonic or syphon jet bowls.

That a system of gravity or mechanical ventilation be installed which will change the air in these toilet rooms at least six times an hour.

That all floors in these toilet and bath rooms shall be provided with waterproof floor and base made of non-absorbent indestructible waterproof material, viz: asphalt, glass, marble, vitrified or glazed tile, terrazzo or monolithic composition with a base not less than six inches high with a sanitary cove at the floor level.

The State Board of Health approved the foregoing recommendations. The Franklin County Commissioners were notified, and they informed us that the recommendations would be carried out.

Holmes County Court House.

This Court House is located at Millersburg, Ohio.

The plumbing consists of 8 water closets, 1 urinal, 11 drinking fountains, 2 slop sinks and 11 wash-stands, making a total of 25 plumbing fixtures.

The house drain consists of stone and iron pipe.

Existing Conditions.

With the exception of the plumbing in the ladies' rest room and mens' toilet room in the basement, the plumbing is very poor. The wash-stands located in the various offices are of the marble slab and china bowl pattern enclosed with wood, the water supply faucets leaky and the traps in bad condition. The drinking fountains on the first and second floors are provided with glasses instead of bubblers. The water closet in the ladies' witness room on the second floor is of a washout pattern, having a large amount of fouling space. The toilet rooms in the Jury and Grand Jury rooms are placed in an interior wall and are not provided with any means of local ventilation.

Recommendations.

In view of the above, I would respectfully recommend—

That the County Commissioners of Holmes County be directed to remove wooden enclosures from wash- stands; replace defective traps and repair leaky faucets; replace washout water closet in womens' witness room with one of a siphonic pattern; install bubbling cups for drinking fountains in corridors on first and second floors; provide a bubbling cup on one of the wash-stands in the women's rest room; provide a system of ventilation in the toilet rooms in the Jury and Grand Jury rooms.

The State Board of Health approved the foregoing recommendations. The Holmes County Commissioners were notified, and they informed us that they would proceed with this work.

Lorain County Infirmary.

This institution is located three miles west of Elyria on the Murray Ridge Road.

The plumbing consists of 19 water closets; 9 sinks; 2 urinals; 5 floor drains; 9 wash basins; 9 bath tubs, and 3 laundry trays, making a total of 57 plumbing fixtures distributed throughout the various buildings.

The house drain consists of iron and stone pipe, and the sewage discharges into the Elyria sewerage system.

Existing Conditions.

The sanitary condition of the plumbing is fair. Toilet rooms and fixtures are neat and clean, with the exception of the plumbing in the Jail House which is very poor.

Ten water closets are located in this building, eight of which are of a hopper pattern, and are flushed by means of a valve located in the corridor. The soil pipe stack in this building appears to be in good condition, although some of the vents have been disconnected, resulting in open sewer connections.

The water supply is furnished from storage tanks by gravity and is inadequate for flushing purposes and fire protection.

Recommendations.

In view of the insanitary conditions in the Jail House of this institution, I would respectfully recommend—

That the plumbing be overhauled and new automatic seat action closets be installed.

That a pneumatic water supply be installed in conection with the well already provided which will maintain a pressure of at least thirty pounds.

A very important feature of this system is the fact that the air tight tank made of wrought iron or steel, may be located anywhere, either in the cellar, stable, underground or at any other point where there is no danger of frost. The tank may be set horizontally or vertically, and arrangements made to have the system work automatically, maintaining at all times the desired minimum pressure.

The installation of this system will not only assist in giving this institution better sanitary conditions, but will afford fire protection as well.

The State Board of Health approved the foregoing recommendations. The County Commissioners were notified, and they informed us that when their new building was completed, changes would be made to relieve the old buildings.

BETTSVILLE SCHOOL.

This school building is located on the northwest corner of David and Washington Streets, Bettsville, Ohio.

The plumbing consists of 1 three compartment and 1 four compartment range closet, 5 urinals, 5 lavatories, 4 drinking fountains, and 1 individual closet, making a total of 22 plumbing fixtures.

The house drain consists of vitrified tile pipe and the sewage discharges into a tight cesspool located in the sidewalk on David St., 150 feet from the building, which overflows into a leaching cesspool 400 feet east and 50 feet west of a ditch that discharges into Wolfe Creek.

Existing Conditions.

The general construction of the plumbing is very poor, no attention having been paid to the requirements of Part 4, Sanitation, Ohio State Building Code.

Cleanouts have not been installed in the sewer, nor at the base of soil pipe stacks. The traps serving the two range closets and the urinals are not provided with cleanouts.

The traps serving the lavatories and drinking fountains are not protected from siphonage or back pressure. The water closet in the second floor toilet room is set directly on a wood floor.

Floor drains with sheet iron strainers made by punching holes through a piece of sheet iron, have been used.

Stack heaters or a mechanical system of ventilation have not been provided for the closets in the girls' toilet rooms, and the closets and urinals in the boys' toilet room.

The architect's specifications require that —

> "all plumbing throughout the buildings and all materials, and the installing of same to be done in strict accordance to the State Sanitary Code, subject to the approval of the State Inspector of Plumbing."

The Division of Engineering has had considerable correspondence relative to the location of the cesspool, and a representative of that department went over the ground and made recommendations to the effect that the provisions of the Building Code be carried out. The provisions of the Code have not been fulfilled, inasmuch as the leaching cesspool is standing full of sewage, and the tight cesspool is built of hollow brick, and is not provided with a cast iron ring and cover.

Recommendations.

In view of these conditions, I would respectfully recommend—

That this work in its entirety be installed in accordance with the requirements of Part 4, Sanitation, Ohio State Building Code, and that the Contractor, R. H. Shively, Architect, and M. E. Wilson, President of the Board of Education be so notified.

The State Board of Health approved the foregoing recommendations. The Board of Education, Bettsville, Ohio, was notified, and informed us that these recommendations would be carried out as soon as school closed for the summer vacation.

CANAL DOVER SCHOOL BUILDINGS.

OAK GROVE SCHOOL.

The Oak Grove school building is located at 5th and Walnut Streets, Canal Dover, Ohio.

The plumbing consists of 1 eight compartment water closet, and 1 twelve compartment water closet, 10 urinals, 2 lavatories, 5 drinking fountains and 1 shower bath.

The house drain is of iron pipe and the sewage discharges into the city sewer system.

Existing Conditions.

The general condition of the plumbing is very poor. A wood platform supporting the iron hopper closets has been built over an open trough which has a great amount of fouling space and very poor ventilation. Lavatory traps in the toilet rooms are in poor shape, and the drinking fountains are improperly connected. The shower in the gymnasium is in very bad condition, and the girls' and boys' toilet rooms are accessible to each other without doors intervening. The plumbing in this building is without any soil or waste vent pipes through the roof, and the toilet rooms are without efficient or local surface ventilation.

Recommendations.

In view of the existing insanitary conditions, I would respectfully recommend—

That the Board of Education of Canal Dover be directed to have this entire system of plumbing and drainage remodeled.

That the wood platforms in these toilet rooms be removed, and the floors cemented.

That a system of sanitary closets be installed properly trapped, and the toilet rooms be properly ventilated.

The State Board of Health approved the foregoing recommendations. The Board of Education, Canal Dover, Ohio, was notified, and we were informed that the changes would be made during the summer vacation.

SECOND STREET SCHOOL.

This school building is located on Second Street, Canal Dover, Ohio.

The plumbing consists of 1 five compartment range closet, and 6 urinal stalls in the boys' toilet room, 1 nine compartment range closet in the girls' toilet room, 2 sinks in the basement, and 2 drinking fountains on the first floor.

Existing Conditions.

The general condition of the plumbing in this building is very poor. The system of mechanical ventilation in the boys' and girls' toilet room is not ventilating these rooms properly. The air in the boys' toilet room is stifling. The sheet iron partitions dividing the urinals into stalls creates a great area of fouling space. Sinks in the basement are not properly trapped and the drinking fountains on the first floor cannot be regulated properly, a glass being used to deflect the pressure. The closet seats in the boys' toilet rooms are broken and in bad condition.

Recommendations.

In view of the existing insanitary conditions, I would respectfully recommend—

That the Board of Education of Canal Dover be directed to have the wood floors in these toilet rooms removed, and the floors cemented.

That the range closets in the boys' and girls' toilet rooms be placed in a sanitary condition, and the seats be repaired or replaced by new fixtures.

That the sinks in the basement be properly trapped, and that the two drinking fountains be provided with foot or hand valves to regulate the flow of water, and that the fixture traps be properly ventilated.

The State Board of Health approved the foregoing recommendations. The Board of Education, Canal Dover, Ohio was notified, and we were informed that the changes would be made during the summer vacation.

NEW VIENNA HIGH SCHOOL AND GRADE SCHOOL.

These school buildings are located in New Vienna, Clinton County, Ohio.

High School.

The plumbing in this building consists of 6 water closets; 3 urinals; 3 sinks and 4 drinking fountains.

The house drain consists of stone pipe, and the sewage discharges into cesspools.

The architects' specifications, page 3, require that —

> "a four inch soil pipe stack be carried through the roof from each toilet room. The connections between lead and iron are to be made with brass ferrules. Where pipe passes through roof they are to be flashed with five pound sheet lead. The entire system of soil and sewer pipes to be tested with water before any filling is done or work concealed."

No attention was paid to the plans and specifications relative to the installation of the plumbing and drainage, and the work is very poorly installed. Instead of two soil pipe lines being carried through the roof, the contractor has carried one soil pipe stack in the girls' toilet room into a surface vent flue, making it possible for sewer air to discharge into the building.

The house drain in this building is defective, permitting sewage to back up into the floor drain in the boiler room.

Grade School.

The plumbing in this building is composed of 1 ten compartment range closet; 1 six compartment range closet; 3 sinks; 4 drinking fountains, and 10 urinal stalls.

The house drain consists of stone pipe, and the sewage discharges into a cesspool.

The four-inch vent stack in the boys' toilet room is not connected to the sewer, the end having been plastered shut. A 1¼ inch pipe is used to vent the sinks and drinking fountains.

This soil pipe stack instead of being carried through the roof as specified has been carried up to the attic, and connected to a ventilating flue. The traps from the closets, urinals and sink in the boiler room are not vented, nor has a vent stack been provided in the girls' toilet room as specified.

Recommendations.

In view of the existing insanitary conditions of the plumbing in these buildings, I would recommend—

That the architect and plumbing contractor be notified of the above conditions, and ordered to place the plumbing and drainage of these buildings in a sanitary condition.

The State Board of Health approved the foregoing recommendations. The Board of Education, New Vienna, Ohio was notified under date of October 8, 1913, but no reply has been received.

TRAVELING LIBRARY, STATE HOUSE.

The Traveling Library, a department of the State Library Bureau, is located in the attic of the State House.

The plumbing consists of one toilet room located over the office of the Public Printer, consisting of one water closet and one lavatory.

The room is without any means of ventilation, has no window in the external wall of the building, nor is it provided with a system of ventilation. The water closet bowl is defective, and at each discharge of this fixture will siphon the trap of the lavatory, breaking its seal and permitting sewer air to pollute the air in the room.

The passage way between the shipping room and the Traveling Library, formerly a toilet room, has ventilating flues at the south and east sides, divided by a 7/8 inch wood partition which permits the odors and gases from the toilet rooms below to gather at this point.

Recommendation.

In view of the existing insanitary conditions, I would respectfully recommend—

That the authorities in charge be directed to properly vent and protect the fixture traps from siphonage; replace defective closet bowl with a new one; place a window in the external wall of this toilet room or provide a mechanical means of ventilation which will change the air at least six times an hour, and provide a floor of non-absorbent, indestructible, water-proof material; properly seal and protect the passage way between the shipping room and the Traveling Library from the odors arising from the toilet rooms below.

The Adjutant General and State Librarian were notified and the recommendation complied with.

OHIO STATE BOARD OF HEALTH,

DEPARTMENT OF PLUMBING INSPECTION.

1913 REPORT.

	Changes Ordered.	Plans, Specifications, Approved.	First Inspection.	Second Inspection.	Final Inspection.	Certificates Issued.	Miscellaneous.	Total.	Buildings Approved, Fees Charged.	Fees Collected.
*January	3	2	3	....	3	3	1	15	3	$2,500
*February	....	....	....	....	....	4	1	5	4	....
March	....	....	3	2	6	7	4	22	7	2,500
‡April	....	....	....	....	....	....	....	....	....	500
May	1	2	11	2	3	4	1	24	4	5,500
June	6	8	10	....	8	10	....	42	10	7,000
July	4	8	23	2	4	....	3	44	......	10,500
August	11	1	14	3	6	5	3	43	5	13,000
September	12	4	22	7	7	11	1	64	11	10,500
October	4	2	30	3	3	3	1	46	3	8,500
November	9	2	22	3	7	6	4	53	6	8,500
December	8	....	23	1	6	1	2	41	1	10,000
	58	29	161	23	53	54	21	399	54	$79,000

* January and February spent revising and compiling that part of the State Building Code relating to plumbing and drainage as per the directions of the Board.

‡ April — Special duty, flood district.

FOLLOWING ARE THE COLLECTIONS MADE BY THIS DEPARTMENT DURING THE YEAR 1913, INCLUDING THE DATE, AMOUNT, RECEIPT NUMBER, PAYEE, THE BUILDING AND ITS LOCATION.

Date.	Amount.	Rec't. No.	Paid by	Address.	For Building Located at
Jan. 21	$5 00	150	S. A. Esswein Co.	24 W. Broad St., Columbus, Ohio	City Library, Tiffin, Ohio.
Jan. 21	5 00	151	S. A. Esswein Co.	24 W. Broad St., Columbus, O.	Perry and Market Sts., Tiffin, Ohio
Jan. 21	5 00	152	The Rockel Co.	25 S. Third St., Zanesville, O.	Grant St., Newark, Ohio
Jan. 30	5 00	153	The Rockel Co.	25 S. Third St., Zanesville, O.	Stevens St., Newark, Ohio
Jan. 30	5 00	154	The Rockel Co.	25 S. Third St., Zanesville, O.	S. Fifth St., Newark, Ohio
Mar. 10	5 00	155	R. A. Redinbo	Sidney, Ohio	High School, Sidney, Ohio
Mar. 10	5 00	156	Kolter & Craft	Wapakoneta, Ohio	C. H. & D. R. R., Wapakoneta, Ohio.
Mar. 18	5 00	157	Piqua Plbg. & Heating Co.	120 N. Wayne St., Piqua, Ohio	Piqua Handle Factory, Piqua, Ohio.
Mar. 18	5 00	158	Ed. Crist	Circleville, Ohio	Pickaway Tp., Pickaway County, Ohio.
Mar. 18	5 00	159	Robt. Raitz Co.	Toledo, Ohio	Lima Locomotive Cor., Lima, Ohio.
Apr. 30	5 00	160	Kolter & Craft	Wapakoneta, Ohio	28 W. Auglaize St., Wapakoneta, Ohio.
May 1	5 00	161	D. J. Sweeney	Urbana, Ohio	Champaign Co. Infirmary, Urbana, Ohio.
May 1	5 00	162	S. Buchanan & Co.	Huntington, Ind.	Mercy Hospital, Tiffin, Ohio.
May 2	5 00	163	Wm. H. Seddon	40 W. State St., Columbus, Ohio	Center St., Marion, Ohio.
May 3	5 00	164	DeBusman & Hennes.	178 S. Washington St., Tiffin, Ohio.	182 S. Washington St., Tiffin, Ohio.
May 3	5 00	165	Jno. C. Hayne	Martins Ferry, Ohio	Center St. and Burlington Rd., Martins Ferry, Ohio.
May 3	5 00	166	Kolter & Craft	Wapakoneta, Ohio	8 Willipie St., Wapakoneta, Ohio.
May 13	5 00	167	Bartholomew Bros.	Zanesville, Ohio	Elks' Club, Zanesville, Ohio.
May 15	5 00	168	Wuellner & Theado	691 Parsons Ave., Columbus, Ohio	Grade School, Empire, Ohio.
May 16	5 00	169	Kolter & Craft	Wapakoneta, Ohio	Auglaize and Blackhoof St., Wapakoneta, O.
May 19	5 00	170	C. C. Weaver	250 Second St., Elyria, Ohio	Lorain Co. Infirmary, Elyria, Ohio.
May 21	5 00	171	E. E. Tuttle	218 W. High St., Lima, Ohio	North St., Lima, Ohio.
June 3	5 00	172	Prebst Bros.	211 E. Center St., Marion, Ohio	N. State St., Marion, Ohio.
June 11	5 00	173	C. C. Runyan	25 W. Park Ave., Mansfield, Ohio	50 W. Park Ave., Mansfield, Ohio.

COLLECTIONS MADE BY THIS DEPARTMENT DURING THE YEAR 1913 — Continued.

Date.		Amount.	Rec't. No.	Paid by	Address.	For Building Located at
June	12	5 00	174	Adam Fey & Son	Fremont, Ohio	Justus St., Fremont, Ohio.
June	17	5 00	175	Wuellner & Theado	691 Parsons Ave., Columbus, Ohio	N. High School, Ada, Ohio.
June	20	5 00	176	Smith & Dieffenbaugh.	109 Arch St., Fremont, Ohio	Co. Children's Home, Norwalk, Ohio.
June	23	5 00	177	E. E. Tuttle	218 W. High St., Lima, Ohio	Allen Co. Infirmary, Lima, Ohio.
June	24	5 00	178	Kolter & Craft	Wapakoneta, Ohio	12 Willipie St., Wapakoneta, Ohio.
June	25	5 00	179	W. E. Frye	Marion, Ohio	Center and Barnhart St., Marion, Ohio.
June	26	5 00	180	M. A. McKale	125 N. Wayne St., Piqua, Ohio	High St., Piqua, Ohio.
June	26	5 00	181	W. H. Conklin Co.	45 N. Fourth St., Columbus, Ohio	Lima Locomotive Cor., Lima, Ohio.
June	26	5 00	182	Theo. G. Schied	5 Mack Building, Lima, Ohio	N. E. Cor. Public Square, Lima, Ohio.
June	30	5 00	183	Justus Plbg. & Heating Co.	24 Plum St., Massillon, Ohio	School Bldg., Beach City, Ohio.
June	30	5 00	184	Theo. G. Schied	5 Mack Building, Lima, Ohio	W. High St., Lima, Ohio.
June	30	5 00	185	Theo. G. Schied	5 Mack Building, Lima, Ohio	Parochial School, Delphos, Ohio.
July	2	5 00	186	Redman & Hollar	16 S. Fourth St., Newark, Ohio	Neal Ave., Newark, Ohio.
July	2	5 00	187	J. H. Thompson	19 West Ave. Elyria, Ohio	Cor. Court and Second St., Elyria, Ohio.
July	5	5 00	188	E. E. Tuttle	218 W. High St., Lima, Ohio	Pa. R. R. and Elizabeth St., Lima, Ohio
July	8	5 00	189	Porterfield Plbg. Co.	3297 Guernsey St., Bellaire, Ohio	32nd and Oak Alley, Bellaire, Ohio.
July	9	5 00	190	Jas. R. Fitton	331 Thirty-third St. Bellaire, O.	17th and Guernsey St., Bellaire, Ohio.
July	10	5 00	191	Hughes Plbg. Co.	3220 Union St., Bellaire, Ohio	Garage and Flats, Bellaire, Ohio.
July	14	5 00	192	Geo. N. Crow	3725 Trumbel St., Dayton, Ohio	34th and Guernsey Sts., Bellaire, Ohio.
July	18	5 00	193	Brooks' Son	42 N. Jefferson St., Dayton, O.	Western College, Oxford, Ohio.
July	18	5 00	194	Theo. G. Schied	5 Mack Building, Lima, O.	S. Central Ave., Lima, Ohio.
July	19	5 00	195	Jno. Shontelmire	1148 S. Main St., Findlay, Ohio	School Bldg., Findlay, Ohio.
July	19	5 00	196	W. H. Ringwald & Sons	42 E. Second St., Chillicothe, Ohio	Main and Bridge Sts., Chillicothe, Ohio.
July	19		197	Kolter & Craft	Wapakoneta, Ohio	W. Auglaize St., Wapakoneta, Ohio.
July	23	5 00	198	W. Schernitzauer	3575 Guernsey St., Bellaire, Ohio	3137 Belmont St., Bellaire, Ohio.

July	25	5 00	199	Lima Plbg. & Heating Co.	125 E. Spring St., Lima, Ohio	High School, Lima, Ohio.
July	25	5 00	200	Lima Plbg. & Heating Co.	125 E. Spring St., Lima, Ohio	Elizabeth and Wayne St., Lima, Ohio.
July	26	5 00	201	J. L. Doty & Son	Bluffton, Ohio	Main St., Bluffton, Ohio.
July	28	5 00	202	W. A. Kreider	Wadsworth, Ohio	Hight St., Wadsworth, Ohio.
July	28	5 00	203	Williams & Hay	Norwalk, Ohio	L. S. & M. S. Depot, Norwalk, Ohio.
July	29	5 00	204	Jasperson Supply Co.	St. Marys, Ohio	Methodist Church, Sidney, Ohio.
July	31	5 00	205	Wm. Zipfel	Oak Harbor, Ohio	Water and Church St., Oak Harbor, Ohio.
July	31	5 00	206	Wm. Zipfel	Oak Harbor, Ohio	Center and Ottawa Sts., Oak Harbor, Ohio.
Aug.	4	5 00	207	Jno. C. Hayne	Martins Ferry, Ohio	Hanover and 5th St., Martins Ferry, Ohio.
Aug.	5	5 00	208	Alexander & Longacre	Fostoria, Ohio	School Bldg., Pemberville, Ohio.
Aug.	5	5 00	209	G. F. Frietchen	Main and Third St., Mansfield, Ohio.	Park and Diamond St., Mansfield, Ohio.
Aug.	6	5 00	210	Adam Fey & Son	Fremont, Ohio	Berger Bros. Stores, Fremont, Ohio.
Aug.	7	5 00	211	D. J. Sweeney	Urbana, Ohio	Main and Market St., Urbana, Ohio.
Aug.	9	5 00	212	Kolter & Craft	Wapakoneta, Ohio	26 E. Auglaize St., Wapakoneta, Ohio.
Aug.	12	5 00	213	T. B. Johns Co.	Lima, Ohio	233 S. Main St., Lima, Ohio.
Aug.	13	5 00	214	Foos & Wehner	Wapakoneta, Ohio	6½ E. Auglaize St., Wapakoneta, Ohio.
Aug.	14	5 00	215	J. F. Schilling	Lima, Ohio	Lima Brewery, Lima, Ohio.
Aug.	15	5 00	216	E. A. Schultz	Defiance, Ohio	5th and Jackson St., Defiance, Ohio.
Aug.	15	5 00	217	T. H. Acres, Jr.	N. Main St., Martins Ferry, Ohio	N. Main St., Martins Ferry, Ohio.
Aug.	15	5 00	218	T. H. Acres, Jr.	N. Main St., Martins Ferry, Ohio	Cor. Park and 7th St., Martins Ferry, Ohio.
Aug.	16	5 00	219	W. H. Drayer	222 S. Main St., Middletown, Ohio.	School Bldg., Middletown, Ohio.
Aug.	18	5 00	220	Wiggins Plbg. Co.	Bowling Green, Ohio	U. B. Church, Bowling Green, Ohio.
Aug.	21	5 00	221	Morgan-Wood Co.	135 W. Spring St., Lima, Ohio	W. Market St., Lima, Ohio.
Aug.	21	5 00	222	Morgan, Wood Co.	135 W. Spring St., Lima, Ohio	Market and Elizabeth St., Lima, Ohio.
Aug.	21	5 00	223	Morgan, Wood Co.	135 W. Spring St., Lima, Ohio	Market and Elizabeth St., Lima, Ohio.
Aug.	21	5 00	224	Wm. Tucker	Oxford, Ohio.	Oxford College, Oxford, Ohio.
Aug.	22	5 00	225	Tillman & Coyle	519 Colburn St., Toledo, Ohio	School Bldg., Archbold, Ohio.
Aug.	25	5 00	226	Wilson & Marion	Ashville, Ohio	School Bldg., Ashville, Ohio.
Aug.	25	5 00	227	C. Hoffman Co.	106 Walnut St., Mansfield, Ohio	148 N. Main St., Mansfield, Ohio.
Aug.	27	5 00	228	Jas. R. Fitton	335 33d St., Bellaire, Ohio	31 Guernsey St., Bellaire, Ohio.
Aug.	28	5 00	229	Pennell Plbg. Co.	Van Wert, Ohio	School Bldg., Convoy, Ohio.
Aug.	29	5 00	230	E. E. Tuttle	218 W. High St., Lima, Ohio	229 S. Main St., Lima, Ohio.
Aug.	29	5 00	231	W. E. Frye	Church and Main St., Marion, Ohio.	W. Center St., Marion, Ohio.
Aug.	29	5 00	232	W. E. Frye	Church and Main St., Marion, Ohio.	E. Center St., Marion, Ohio.
Sept.	2	5 00	233	I. W. Donahue	London, Ohio	High School, London, Ohio.
Sept.	3	5 00	234	W. E. Frye	Church and Main St., Marion, Ohio.	E. Center St., Marion, Ohio.

COLLECTIONS MADE BY THIS DEPARTMENT DURING THE YEAR 1913 — Continued.

Date.	Amount.	Rec't. No.	Paid by	Address.	For Building Located at
Sept. 5	5 00	235	The Huffman-Conklin Co.	669 N. High St., Columbus, Ohio	Indiana Ave., Newark, Ohio.
Sept. 6	5 00	236	E. E. Tuttle	218 W. High St., Lima, Ohio	Ottoville, Ohio.
Sept. 8	5 00	237	Edw. Crist	Circleville, Ohio	School Bldg., Williamsport, Ohio.
Sept. 10	5 00	238	T. O'Brein & Co.	Upper Sandusky, Ohio	City Library, Upper Sandusky, Ohio.
Sept. 10	5 00	239	T. M. Cunningham	Marion, Ohio	124 E. Center St., Marion, Ohio.
Sept. 10	5 00	240	T. M. Cunningham	Marion, Ohio	DeWolfe Court, Marion, Ohio.
Sept. 10	5 00	241	T. M. Cunningham	Marion, Ohio	S. State St., Marion, Ohio.
Sept. 16	5 00	242	W. E. Frye	Church and Main St., Marion, Ohio.	E. Center St., Marion, Ohio.
Sept. 18	5 00	243	Henry Meyer	Bucyrus, Ohio	Picture Theatre, Bucyrus, Ohio.
Sept. 18	5 00	244	S. A. Esswein Co.	24 W. Broad St., Columbus, Ohio	School Bldg., Morrow, Ohio.
Sept. 18	5 00	245	S. A. Esswein Co.	24 W. Broad St., Columbus, Ohio	School Bldg., Bucyrus, Ohio.
Sept. 19	5 00	246	T. B. Johns Co.	211 S. Main St., Lima, Ohio	227 S. Main St., Lima, Ohio.
Sept. 19	5 00	247	T. B. Johns Co.	211 S. Mai nSt., Lima, Ohio	226 S. Union St., Lima, Ohio.
Sept. 25	5 00	248	Burke Bros.	89 Jefferson St., Tiffin, Ohio	Monroe St., Tiffin, Ohio.
Sept. 25	5 00	249	J. R. Slaughter	725 Pearl St., Martins Ferry Ohio	Broadway and Madison St., Martins Ferry, O.
Sept. 25	5 00	250	J. R. Slaughter	725 Pearl St. Martins Ferry Ohio	Broadway St., Martins Ferry, Ohio.
Sept. 26	5 00	251	Bissell & Derr	Wooster, Ohio	School Bldg., Big Prairie, Ohio.
Sept. 27	5 00	252	R. H. Slack	Middletown, Ohio	410 E. 3rd St., Middletown, Ohio.
Sept. 29	5 00	253	M. W. Townsend	Martinsville, Ohio	School, Wayne Tp., Clinton County, Ohio.
Oct. 1	5 00	254	The John Arpp Co.	Middletown, Ohio	Court House, Hamilton, Ohio.
Oct. 2	5 00	255	The Ricker Plbg. & Heating Co.	Canal Dover, Ohio	N. Wooster St., Canal Dover, Ohio.
Oct. 3	5 00	256	The Huffman-Conklin Co.	669 N. High St., Columbus Ohio	League St., Norwalk, Ohio.
Oct. 3	5 00	257	E. H. Hill	Wauseon, Ohio	T. & I. R. R., Wauseon, Ohio.
Oct. 6	5 00	258	Hildreth & Pace	Marion, Ohio	Prospect and Church St., Marion, Ohio.

Oct. 8	5 00	259	Pennell Plbg. Co.	Van Wert, Ohio	Lutheran Church, Van Wert, Ohio.
Oct. 9	5 00	260	Caldwell-Semple Co.	Sharon, Pa.	Springfield Lake, Summit County, Ohio.
Oct. 10	5 00	261	Crain & Goodwin	Paulding, Ohio	Court House, Paulding, Ohio.
Oct. 11	5 00	262	Xenia Peterson	330 S. Pine St., Lima, Ohio	W. Wayne St., Lima, Ohio.
Oct. 13	5 00	263	P. H. Meyers Co.	640 Preston St., Louisville, Ky.	2nd and Hamilton St., Hamilton, Ohio.
Oct. 13	5 00	264	J. W. McClure	Tippecanoe City, Ohio	Fifth St., Tippecanoe City, Ohio.
Oct. 16	5 00	265	The Doering Hardware Co.	Wapakoneta, Ohio	Kreitzer Bros. Drug Store, Wapakoneta, O.
Oct. 27	5 00	266	C. A. Kottmeier	Ashland, Ohio	Ashland, Ohio.
Oct. 17	5 00	267	D. J. Sweeney	Urbana, Ohio	County Infirmary, Urbana, Ohio.
Oct. 28	5 00	268	S. A. Esswein Co.	24 W. Broad St., Columbus, Ohio	Indiana and Buena Vista, Newark, Ohio.
Oct. 30	5 00	269	Morgan-Wood Co.	Lima, Ohio	E. Wayne St., Lima, Ohio.
Oct. 30	5 00	270	Morgan-Wood Co.	Lima, Ohio	139 W. Spring St., Lima, Ohio.
Nov. 4	5 00	271	E. E. Tuttle	218 W. High St. Lima, Ohio	C. H. & D. R. R., Lima, Ohio.
Nov. 4	5 00	272	Kolter & Craft	Wapakoneta, Ohio	Blackhoof St., Wapakoneta, Ohio.
Nov. 6	5 00	273	T. M. Sheppard Co.	W. Main St., Ashland, Ohio	Main St., Ashland, Ohio.
Nov. 8	5 00	274	The Riley & Nickel Hardware Co.	Celina, Ohio	W. Wayne St., Celina, Ohio.
Nov. 8	5 00	275	Jno. R. Wagner	213 N. Shuler Ave., Hamilton, Ohio.	S. 2nd and Hanover St., Hamilton, Ohio.
Nov. 10	5 00	276	Kreamer & Weber	226 Cheney St., Canal Dover, Ohio	School Bldg., Canal Dover, Ohio.
Nov. 11	5 00	277	J. R. Slaughter	Martins Ferry, Ohio	Haskins Glass Co. Office Bldg., Martins Ferry, Ohio.
Nov. 11	5 00	278	Huffman & Andrews.	Leipsic, Ohio	St. Anthony's Church and School, Columbus Grove, Ohio.
Nov. 15	5 00	279	Younkman Bros.	Fremont, Ohio	Cor. E. State and Elliott St., Fremont, Ohio.
Nov. 18	5 00	280	E. E. Tuttle	Lima, Ohio	W. High St., Lima, Ohio.
Nov. 18	5 00	281	Burkle Bros.	Martins Ferry, Ohio	Store and Flat, Yorkville, Ohio.
Nov. 19	5 00	282	A. E. Henry	Spencerville, Ohio	School Bldg., Spencerville, Ohio.
Nov. 21	5 00	283	The J. L. Walker Co.	231 Court St., Hamilton, Ohio	School Bldg., Hamilton, Ohio.
Nov. 21	5 00	284	V. J. Simon	Millersburg, Ohio	Holmes County Children's Home, Millersburg, Ohio.
Nov. 26	5 00	285	Larsen-Wood Co.	Toledo, Ohio	High School, Bowling Green, Ohio.
Nov. 26	5 00	286	Morgan-Wood Co.	Lima, Ohio	Main and Kibly St., Lima, Ohio.
Nov. 26	5 00	287	T. M. Sheppard Co.	Ashland, Ohio	Elite Mfg. Co., Factory, Ashland, Ohio.
Dec. 1	5 00	288	Piqua Plumbing & Heating Co.	Piqua, Ohio	Office Bldg., Favorite Stove and Range Co., Piqua, Ohio.
Dec. 2	5 00	289	Hughes Plbg. Co.	Bellaire, Ohio	3348 Belmont St., Bellaire, Ohio.
Dec. 3	5 00	290	Walter Marlatt	Mansfield, Ohio	Main St., Shelby, Ohio.

COLLECTIONS MADE BY THIS DEPARTMENT DURING THE YEAR 1913—Concluded.

Date.	Amount.	Rec't. No.	Paid by	Address.	For Building Located at
Dec. 3	5 00	291	Justus Plbg. & Heating Co.	Massillon, Ohio	School Bldg., Beach City, Ohio.
Dec. 4	5 00	292	Armstrong Co.	London, Ohio	P. C. C. & St. L. R. R. Passenger Depot, Piqua, Ohio.
Dec. 4	5 00	293	H. M. Bell	Mansfield, Ohio	Cor. Vienna and Marion Ave., Mansfield, O.
Dec. 5	5 00	294	Lima Plbg. & Heating Co.	Lima, Ohio	E. Kibly St., Lima, Ohio.
Dec. 5	5 00	295	Lima Plbg. & Heating Co.	Lima, Ohio	E. North St., Lima, Ohio.
Dec. 6	5 00	296	Jno. C. Hayne	Martins Ferry, Ohio	N. 3rd St., Martins Ferry, Ohio.
Dec. 10	5 00	297	Chas. Hoffman Co.	106 Walnut St., Mansfield, Ohio	N. W. Cor. 3rd and Main, Mansfield, Ohio.
Dec. 17	5 00	298	Pennsylvania R. R.	Clveland, Ohio	Pasenger Station, Martins Ferry, Ohio.
Dec. 17	5 00	299	Bud M. Moore	Mansfield, Ohio	W. Main St., Shelby, Ohio.
Dec. 18	5 00	300	Wm. Foulk	Bellefontaine, Ohio	Presbyterian Church, Belle Center, Ohio.
Dec. 18	5 00	301	D. J. Sweeney	Urbana, Ohio	N. Main St., Urbana, Ohio.
Dec. 18	5 00	302	Doering Hdwe. Co.	Wapakoneta, Ohio	C. A. Kolters' Saloon, Wapakoneta, Ohio.
Dec. 19	5 00	303	Bud M. Moore	Mansfield, Ohio	W. Third St., Mansfield, Ohio.
Dec. 23	5 00	304	W. H. Kuhn	Bridgeport, Ohio	Presbyterian Church, Bridgeport, Ohio.
Dec. 24	5 00	305	Cheney & Crider	226 N. Main St., Mansfield, Ohio	174-176 N. Main St., Mansfield, Ohio.
Dec. 24	5 00	306	W. E. Frye	Marion, Ohio	Mark St., Marion, Ohio.
Dec. 31	5 00	307	Earle H. Hill	Wauseon, Ohio	Fulton and Commercial St., Wauseon, Ohio.

PUBLIC COMFORT STATIONS.

Laws provide that public toilet accommodations are necessary in public and semi-public buildings where a large number of people are employed or congregate.

How much more necessary are public comfort stations in city squares, public parks and other places where people assemble for business or pleasure. Statistics show that thousands of persons avail themselves of the advantages offered in cities where stations have been erected.

In many instances the proposed erection of public comfort stations has been complicated and delayed by legal techicalities, and to eliminate these conditions the following draft of a bill, similar to that adopted by the Pennsylvania legislature, is submitted.

A BILL.

To authorize all cities and municipal corporations in the State of Ohio to construct and maintain comfort and waiting stations and drinking fountains in the public highways of such municipalities, and providing the manner of ascertaining and collecting the damages caused by the construction of such improvements.

SECTION 1. *Be it enacted, etc.,* That, in addition to the powers now existing in the cities and municipalities of this State over the public highways therein, said cities and municipalities shall also have power to construct and maintain in any of the highways within their corporate limits, respectively, comfort and waiting-stations and drinking-fountains, or either, for the convenience of the traveling public.

SECTION 2. Any damages that may accrue to abutting properties by reason of the construction of the aforesaid improvements, or either of them, shall be ascertained and collected in the same manner as provided by law for ascertaining and collecting damages to abutting properties caused by grading of streets in such municipalities, respectively.

SECTION 3. All Acts or parts of Acts in conflict herewith be and the same are hereby repealed.

DRINKING FOUNTAINS AND TOILET ROOMS STATE HOUSE.

The lack of public toilet accommodations and drinking fountains in the State House is a matter that should be given some consideration and an effort made to provide those who visit the Capitol seeking information and upon official business with toilet facilities.

It is obvious that the present toilet rooms are inadequate and were not installed for public use. The practice of using the common drinking glass in the House and Senate Chambers should be eliminated by providing drinking fountains.

ADMINISTRATIVE LAWS.

If the people of Ohio are to receive equal service and secure the benefits of a standardized plumbing code, it is necessary that the scope of the authority of the State Board of Health be broadened, permitting the appointment of deputy plumbing inspectors, changing the present set fee system to a graduated fee system, and authorizing them in conjunction with the Ohio State University to conduct tests and research upon the methods of construction.

The set fee system as provided by law is an excessive charge upon a system of plumbing composed of one to four fixtures and is insufficient to cover the service rendered for the supervision of a large system that requires numerous inspections.

Unequal service and the physical impossibility of one person to cover the inspections, examine plans and take care of the correspondence of the office, causing delay in construction and the payment of final estimates, are the principal criticisms.

PROPOSED AMENDMENTS.

A BILL.

To amend Sections 1261-2, 1261-3, 1261-4, 1261-5, 1261-6, 1261-8, 1261-9, 1261-10, 1261-11, 1261-12, 1261-13 and 1261-15 of the General Code relating to the Inspection of Plumbing.

Be it enacted by the General Assembly of the State of Ohio:

Section 1. That Sections 1261-2, 1261-3, 1261-4, 1261-5, 1261-6, 1261-8, 1261-9, 1261-10, 1261-11, 1261-12, 1261-13 and 1261-15 be amended so as to read as follows:

Section 1261-2. It shall be the duty of the state board of health, within ninety days after passage and approval of this act, to appoint an elector of this state to fill the office of state inspector of plumbing, *who shall* hold office until such time as his successor may be appointed and qualified. The person so appointed must be a plumber with at least ten years experience. *The state board of health may appoint such number of deputy inspectors as the necessities of the work shall require and the appropriations for such inspection will permit. Such deputy inspectors shall be practical plumbers with at least seven years experience, and skilled and well trained in matters pertaining to sanitary regulations concerning plumbing work.* The state board of health shall have the power to make and enforce rules and regulations governing plumbing, *and register those persons engaged in or at the business* to carry out the provisions of this Act.

Section 1261-3. It shall be the duty of said inspector of plumbing, as often as instructed by the state board of health, to inspect any and all public or private institutions, sanitariums, hospitals, schools, prisons, factories, workshops, or places where men, women, or children are or might be employed, and to condemn any and all unsanitary or defective plumbing that may be found in connection therewith, and to order such changes in the method of construction of the drainage and ventilation, as well as the arrangement of the plumbing appliances, as may be necessary to insure the safety of the public health.

Such inspector shall not exercise any authority in municipalities or other political subdivisions wherein ordinances or resolutions have been adopted *and are being enforced* by the proper authorities regulating plumbing or prescribing the character thereof.

Section 1261-4. He shall hold himself in readiness at any and all times to go to any part of the state if so directed by the *executive officer of the* state board of health, for the purpose of making a sanitary inspection of any building or other place that *he has* reason to believe is in such a condition as to be a menace to public health.

SECTION 1261-5. When any building is found to be in a sanitary condition or when changes are ordered in the plumbing, drainage or ventilation have been made, and after a thorough inspection on approval by said inspector of plumbing, he shall issue a certificate signed by himself and countersigned by the *executive officer of the* state board of health, which must be posted in a conspicuous place for the benefit of the public at large. Upon notification by said inspector, said certificate shall be revoked for any violation of this act.

SECTION 1261-6. *No plumbing work shall be done in this state in any building or place coming within the jurisdiction of the state inspector of plumbing, except in cases of repairs or leaks in existing plumbing, until a permit has been issued and suitable plans and specifications have been filed with and approved by the state inspector of plumbing and the executive officer of the state board of health. Before granting such permit, an application shall be made by the owner of the property or by the person, firm or corporation who is to do the work. Such applications shall be made on blanks prepared for the purpose, and each application shall be accompanied by a fee of one (1) dollar, and an additional fee of fifty (50) cents for each trap or vented fixture up to and including ten fixtures, and for each trap or vented fixture over ten a fee of ten (10) cents. The fees so collected shall be paid into the state treasury and credited to the fund provided for the payment of the expenses of the state inspector of plumbing.*

SECTION 1261-8. *No* inspector so appointed shall * * * , during his term of office, be engaged or interested in the plumbing business or the sale of any plumbing supplies, nor shall he act as agent, directly or indirectly, for any person or persons so engaged.

SECTION 1261-9. *The state inspector of plumbing and the deputy inspectors shall receive such salaries as are fixed by the state board of health. The necessary traveling and other expenses of inspectors while in the performance of their official duties, shall be paid from the fund provided for that purpose.*

SECTION 1261-10. *State inspectors of plumbing* shall have the power between sunrise and sunset to enter any * * * building where *there is* good and sufficient reason to believe that the sanitary condition of such premises is such as to endanger the public health, for the purpose of making such inspection as may be necessary to ascertain the condition of the same.

SECTION 1261-11. *The state inspector of plumbing* shall report promptly to the state board of health the condition of all premises inspected by him *or by his deputies;* also the number of inspections and changes ordered, as well as any other information *concerning his* office that they may require.

SECTION 1261-12. *The state inspector of plumbing* shall be provided with a suitable office in the city of Columbus, as well as with all necessary apparatus for making tests, and such *furniture, stationery and supplies* as the business of his office may require.

SECTION 1261-13. It shall be the duty of any owner, agent or manager, of any * * * building where an inspection is *made* by said inspector of plumbing, to cause or have the entire system of drainage and ventilation repaired, as he may direct. After due notice to repair such work, it shall be the duty of said owner, agent or manager to notify said inspector of plumbing that such work is ready for his inspection. Failing to have the work ready for inspection at *the time specified in* such notice, he will be subject to such penalty as hereinafter provided.

SECTION 1261-15. It shall be the duty of said inspector of plumbing upon receipt of the knowledge that any part of this act has been violated, to go before any justice of the peace *within the county, or a justice of the peace, mayor or* *police judge of the municipality where the offence was committed or the offending person resides*, and cause the arrest and prosecution of all persons whom he has reason to believe are guilty of such violations.

SECTION 2. That said original sections, 1261-2, 1261-3, 1261-4, 1261-5, 1261-6, 1261-8, 1261-9, 1261-10, 1261-11, 1261-12, 1261-13, and 1261-15 of the General Code be and the same are hereby repealed.

Respectfully submitted,

WM. C. GROENIGER,
State Inspector of Plumbing.

REPORT

OF

Division of Hygienic Laboratories

ANNUAL REPORT OF THE HYGIENIC LABORATORIES.

I have the honor to submit the following report of the Hygienic Laboratories for the year ending December 31, 1913.

The total number of examinations made during the year was 12,053 classified as follows:

Diphtheria	4,951
Tuberculosis	2,992
Widals	1,095
Malaria	23
Rabies	190
Water	2,158
Sewage	33
Miscellaneous	611

The following table is a summary of the number and kinds of examinations made each month of the year 1913:

	Diphtheria.	Tuberculosis.	Widals.	Malaria.	Rabies.	Miscellaneous.	Water.		
							Chem.	Bact.	Sewage.
Jan.	118	269	39	3	11	160	42	65	0
Feb.	184	260	43	1	13	51	15	22	0
March	121	255	54	0	15	106	33	38	0
April	74	250	70	3	17	35	16	244	0
May	85	356	61	1	30	9	43	128	0
June	107	250	57	3	18	5	71	185	4
July	85	247	109	1	23	32	63	160	0
August	101	209	196	3	11	83	69	320	2
Sept.	396	204	198	2	14	5	50	274	21
Oct.	844	232	127	2	10	60	89	230	0
Nov.	1,235	221	79	2	13	57	29	105	6
Dec.	1,601	239	62	2	15	8	37	107	0
	4,951	2,992	1,095	23	190	611	557*	1,878*	33

*The total number of chemical and bacteriological analyses does not represent individual samples, but represents the analyses of 2,158 samples of which chemical and bacteriological examinations were made.

The above tables show that during the year 1913 there has been a remarkable increase in the number of specimens submitted and examined over any preceding year. The total number of specimens examined during the year 1911 was 5,368 which represented an increase of 15% over the year 1910, while in 1912, 6,929 examinations were made, representing an increase of 1,529 or 22% over 1911. During the year ending December 31, 1913, 12,053 specimens were examined, showing that 5,124 more specimens were received than in 1912, or representing an increase of 42.5%. This increase in the number of specimens is almost equal to the number of examinations made during the entire year of 1911, and only 1,805 less than the total number examined during 1912. All of this work has been done with no increase in the laboratory staff.

This remarkable increase has occurred in all classes of examinations. The only decrease is shown in the chemical examination of water, which is due, in part, to a change in policy, restricting the health officer to submitting samples of water for bacteriological examinations only; whereas in 1912 chemical analyses for them were also made. This change in system does not account in any way for the great increase in bacteriological examinations of water. The greatest increase is shown in the case of diphtheria. A part of this is due to an investigation carried on at the Boys' Industrial School, Lancaster. The authorities of this institution had been troubled with an unusual amount of diphtheria and it was decided to make a routine examination of every inmate of the institution and if possible to determine who were the diphtheria carriers. These tables indicate clearly that the physicians and health officers are calling on the laboratories to assist them in making a correct diagnosis of the different diseases and general sanitary conditions of the water supplies. It is also gratifying to know that there are now over 1,300 physicians in the state who send in specimens for diagnosis. It is also interesting to note that physicians are asking the laboratory to examine specimens outside of the ordinary routine examinations which will assist them in clearing up doubtful cases.

TABLES SHOWING NUMBER OF EXAMINATIONS CLASSIFIED.

DIPHTHERIA.

	Positive.	*Negative.*	*Atypical.*	*Total.*
Jan.	37	75	6	118
Feb.	38	142	4	184
March	22	97	2	121
April	24	49	1	74
May	28	55	2	85
June	38	62	7	107
July	36	43	6	85
August	45	49	7	101
Sept.	131	239	26	396
October	229	553	62	844
Nov.	225	965	45	1,235
Dec.	264	1,287	50	1,601
	1,117	3,616	218	4,951

The total number of diphtheria specimens examined during the year shows an increase of 3,684 or 74.4% over the preceding year. A part of this increase is attributed to the investigations carried on at the Boys' Industrial School, Lancaster. Of the total number of specimens examined only 22.5% were positive. This low percentage of positives may be acocunted for in part by the Lancaster investigation and in part to the fact that physicians are beginning more and more to call on the laboratories to assist them in doubtful cases.

TUBERCULOSIS.

	Positive.	*Negative.*	*Suspicious.*	*Unsatisfactory.*	*Total.*
Jan.	50	218	0	1	269
Feb.	58	201	0	1	260
March	71	184	0	0	255
April	55	195	0	0	250
May	82	274	0	0	356
June	66	184	0	0	250
July	78	169	0	0	247
Aug.	68	141	0	0	209
Sept.	69	135	0	0	204
Oct.	62	170	0	0	232
Nov.	60	160	1	0	221
Dec.	66	173	0	0	239
	785	2,204	1	2	2,992

While the number of specimens of sputum submitted shows an increase over the preceding year, still the margin is small, only 150, or an increase of 5%. The percentage of positive findings shows a slight decrease over the preceding year which seems to indicate that physicians are paying more attention to incipient and doubtful cases with the hope of arriving at an early diagnosis.

WIDALS.

	Positive.	*Negative.*	*Atypical.*	*Unsatisfactory.*	*Total.*
Jan.	10	22	7	0	39
Feb.	11	28	4	0	43
March	4	46	4	0	54
April	5	59	6	0	70
May	3	53	5	0	61
June	11	44	2	0	57
July	30	68	11	0	109
Aug.	50	99	47	0	196
Sept.	52	98	48	0	198
Oct.	33	63	31	0	127
Nov.	20	45	14	0	79
Dec.	9	42	10	1	62
	238	667	189	1*	1,095

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* Insufficient blood. A satisfactory examination impossible.

There were 193 more requests for the Widal reaction than during 1912, or an increase of 17.6%.

RABIES.

	Positive.	*Negative.*	*Suspicious.*	*Unsatisfactory.*	*Total.*
Jan.	10	1	0	0	11
Feb.	8	4	1	0	13
March	12	3	0	0	15
April	10	5	0	2	17
May	12	16	0	2	30
June	7	8	0	3	18
July	9	13	0	1	23
Aug.	4	6	0	1	11
Sept.	3	9	0	2	14
Oct.	4	6	0	0	10
Nov.	10	3	0	0	13
Dec.	12	2	1	0	15
	101	76	2	11	190

The total number of specimens examined during the year was 190 representing an increase of 9 or 4.8% over the year of 1912.

During the year 1912 there were examined 181 specimens of which only 86 were positive, with 91 negative, 1 suspicious and 3 unsatisfactory, whereas in 1913, a marked contrast to the positive finding is noted. There were 101 positive examinations, 76 negatives, 2 suspicious and 11 unsatisfactory. Assuming that this is a normal increase in specimens it would seem to indicate that rabies is becoming more prevalent each year. Unfortunately there are a few physicians and many among the laity who do not seem to appreciate the value of properly submitting heads of animals to the laboratories for examination. The dog is either killed before the symptoms have sufficiently advanced necessary for the pathological changes to develop, or else the head is not packed in ice. We have received a number of heads in which the brain has been completely decomposed, or else in such a soft condition as to make a satisfactory examination impossible. Strange to say specimens received in this manner have been on the increase during the past year.

MALARIA.

	Positive.	*Negative.*	*Atypical.*	*Unsatisfactory.*	*Total.*
Jan.	0	3	0	0	3
Feb.	0	1	0	0	1
March	0	0	0	0	0
April	0	3	0	0	3
May	0	1	0	0	1
June	0	2	0	1	3
July	0	1	0	0	1
August	1	2	0	0	3

	Positive.	*Negative.*	*Atypical.*	*Unsatisfactory.*	*Total.*
Sept.	1	0	1	0	2
Oct.	0	2	0	0	2
Nov.	0	1	0	1	2
Dec.	0	2	0	0	2
	2	18	1	2	23

The small number of requests for malarial examinations seems sufficient to indicate that physicians regard the presence of malaria in the state as of very little consequence. The presence of malaria seems to be limited to the counties bordering on the Ohio River.

CHEMICAL ANALYSES OF WATER.

	Proposed.	*Existing.*	*Quality.*	*Typhoid.*	*Total.*
Jan.	1	33	7	1	42
Feb.	1	12	1	1	15
March	7	26	0	0	33
April	7	7	2	0	16
May	12	21	10	0	43
June	14	31	26	0	71
July	10	33	19	1	63
August	15	49	5	0	69
Sept.	13	35	0	2	50
Oct.	12	73	2	2	89
Nov.	6	23	0	0	29
Dec.	17	20	0	0	37
	115	363	72	7	557

BACTERIOLOGICAL ANALYSES OF WATER.

	Proposed.	*Existing.*	*Quality.*	*Typhoid.*	*Total.*
Jan.	2	42	6	15	65
Feb.	2	12	5	3	22
March	7	25	4	2	38
April	9	87	138	10	244
May	8	23	79	18	128
June	14	40	92	39	185
July	10	64	50	36	160
August	17	80	51	172	320
Sept.	13	51	49	161	274
Oct.	14	82	52	82	230
Nov.	10	29	21	45	105
Dec.	19	32	17	39	107
	125	567	564	622	1,878

The above tables show that while there has been a decrease in the number of chemical analyses, which is explained earlier in the report, there has been a marked increase in the number of bacteriological examinations which shows a more active interest among the health officers to ascertain the quality of the well waters in their communities.

MISCELLANEOUS.

Bacteriological specimens not included in the above tables.

Examinations for the tubercle bacillus.

Specimens of urine	4
Specimens of spinal fluid	2
Specimens serum from pleural cavity	1
Specimens of pork	1
Specimens of pus	1
Total	9

Water and Milk Examinations for B. Coli and Bacterial Count.

Bile tubes for B. Coli examinations	245
Plates for count	258
Milk for B. Coli and count	10
Total	513

Irregular Miscellaneous Specimens not Classified.

Lower jaw of hog for lesions	1
Specimen of worm	1
Material from stomach for Sarcoma	2
Specimen causing infection in swine	1
Vaginal secretion for gonococci	3
Specimen of cheese	3
Specimen of Bacterial growth	2
Specimens of urine for albumin	4
Specimen of Weinerwurst	1

Irregular Miscellaneous Specimens not Classified.

Swab for Erysipelas	1
Specimens for micrococci	2
Specimens of fluid from distended abdomen	1
Specimen from jaw of calf for glanders	1
Slide for diphtheria bacilli	1
Japanese Spinning Mouse for rabies	1
Specimen of blood for para-colon and typhoid bacteria	1
Specimen of spinal fluid for meningococci	1
Specimens of tissue	1
Culture for identification	2
Apple sauce for Paris green	1
Specimen of milk for diphtheria bacilli	1
Total	32

Miscellaneous Chemical Analyses not Classified.

Plates for identification	2
Milk for formaldehyde	1
Bleaching powder	4
Bleach liquor	6
Chloride of lime	2
Samples for lead	7
Samples of sewage for putrescibility	2
Samples of water for putrescibility	3
Samples of alum	1
Golden Cross Condensed milk for residue	1
Sample of water for worms	1
Samples of water for caustic alkalinity	22
Samples of mud	2
Samples of water for color and carbonaceous matter	2
Specimen of pork for copper	1
Total	57

During the year two changes were made in the personelle of the laboratory staff. Mr. Ralph Alvord was appointed to fill the position made vacant by the resignation of Mr. Calvin Robinson. Mrs. Ila Mizer was appointed stenographer to fill the position occupied by Miss Margaret Richter, the latter being transferred to another department.

The stenographic work of this division has more than doubled what it was during the year 1912 and it is a physical impossibility for any one stenographer to do all of this work in anything like a satisfactory manner. I would therefore, recommend that an additional stenographer be added to this division.

As pointed out in the first part of this report, while the amount of work has practically doubled what it was in 1913 there has been no additioanl help added to the laboratory staff and if the work continues to increase, which we hope it will, additional help will be required in the near future.

During the year members of the staff have been engaged in some original investigations and the report of this work will appear early in 1914.

Respectfully submitted by

T. R. Brown,
Director of Hygienic Laboratories.

To
Dr. E. F. McCampbell,
Secretary and Executive Officer,
Ohio State Board of Health.

CITY AND VILLIAGE HEALTH OFFICERS

HEALTH OFFICERS IN CITY AND VILLAGES.

Place.	Name.
Aberdeen	Dr. A. R. Carrigan.
Ada	James F. Jamison.
*Adamsville	Dr. W. C. Kinner.
*Addyston	Louis Buckwalt.
Adelphi	J. H. Karshner.
*Adena	A. E. Stringer.
*Agosta P. O. (New Bloomington)	W. H. Carey.
Akron	Dr. A. A. Kohler.
Albany	
*Alexandria	
*Alger	Sant Newland.
Alliance	Dr. W. H. Burns.
Alvordton	George Pifer.
Amanda	Dr. J. E. Hewitson.
*Amelia	Dr. Homer C. Behymer.
Amesville	Dr. G. E. Flinn.
*Amherst	Dr. Washington Foster.
*Amsterdam	S. H. Carter.
Andover	A. Kingsley.
*Anna	Dr. Edwin A. Steely.
*Ansonia	Dr. J. C. Poling.
*Antioch	Dr. D. W. Lowe.
*Antwerp	Charles W. Boland.
*Apple Creek	Harry H. Wilhelm.
*Arcadia	Joseph Boley.
*Arcanum	Dr. Ira H. Hawes.
*Archbold	August Ruihley.
*Arlington	Thomas B. Trovinger.
*Arlington Heights	Wm. L. Goertemiller.
Arnettsville, (Pitsburg P. O.)	Dr. J. O. Starr.
Ashville	John Johnson.
*Ashland	Dr. W. H. Roasberry.
*Ashley	Dennis G. Welch, D. D. S.
Ashtabula	Dr. A. W. Hopkins.
*Athalia	C. M. Defoor.
Athens	Dr. J. M. Higgins.
*Attica	John A. Ritz.
*Avon, (Avon Lake P. O.)	Fred G. Engel.
*Bainbridge	Dr. W. W. Davis.
*Bairdstown	M. E. Carmean.
Baltic	W. A. Lentz.
Baltimore	N. B. Niebel.
Barberton	Dr. W. A. Mansfield.

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* In lieu of a board of health.

Place.	Name.
Barnesville	J. W. Fowler.
*Barnshill	Chas. Henderson.
Batavia	Peter Ballinger.
*Batesville	Caleb Mercer.
*Bay, (See North Dover P. O.)	Geo. L. Osborn.
Beach City	W. A. Justice.
*Beallsville	Dr. W. S. Burcher.
*Beaver	F. M. Stolling.
Beaver Dam	Dr. E. C. Yingling.
Bedford	J. W. Anderton.
Bellaire	Dr. D. W. Boone.
Bellbrook	John R. Whitacre.
*Belle Center	W. G. Oliphant.
Bellefontaine	Dr. A. J. McCracken.
*Belle Valley	F. M. Dennis.
Belleville	Dr. J. W. Kelly.
Bellevue	Dr. J. F. Miller.
Belmont	David Pangle.
Belmore	Dr. W. C. Miller.
Beloit	S. B. Gray.
*Belpre	P. B. Richardson.
Benton Ridge	Dr. R. D. Whisler.
Berea	Dr. A. A. Smith.
*Bergholz	John Connor.
*Berlin Heights	Dr. G. W. Hine.
*Berne P. O., (Carlisle)	J. M. Bucker.
*Bethel	Fred H. Scott.
*Bethesda	Dr. D. T. Phillips.
*Bettsville	Henry M. Craig.
Beverly	Fred H. Hart.
Bexley	Daniel P. Bailey.
*Blakeslee	R. F. Jones.
*Blanchester	A. Titus.
*Bloomdale	Dr. Charles B. Hatfield.
*Bloomfield, (See Bloomingdale P. O.)	Dr. W. G. Lyle.
*Bloomingburg	G. W. Gordon.
*Bloomingdale P. O., (Bloomfield)	Dr. W. G. Lyle.
*Bloomington, (Wooster P. O.)	Prof. Jno. G. Black.
Bloomville	
Bluffton	Dr. R. E. Hughson.
*Bolivar	W. T. Smith.
*Boston, (See Owensville P. O.)	Dr. W. E. Leever.
*Botkins	Dr. Frederick R. McVay.
Bourneville	
*Bowerston	C. D. Royer.
*Bowersville	J. E. Steward.
Bowling Green	C. P. Fowler.
*Bradford	Dr. H. M. Forman.
*Bradner	O. J. Mitchell.
*Bratenahl	Peter Gommet.
*Bremen	Dr. A. A. Bradford.

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* In lieu of a board of health.

Place.	Name.
Brewster	Joseph Geiss.
*Bridgeport	Wm. H. Cox.
Brilliant	J. M. Boyle.
*Brinkhaven P. O., (Gann)	William Hunter.
*Brooklyn Heights	Joseph E. Richardson, Cleveland, R. D. No. 3.
*Brookside	Louis Elslager.
Brookville	B. F. Shafer.
*Broughton	James O. Grunden.
Bryan	R. M. Rice.
*Buchtel	Will Wright.
Buckeye City	
*Buckland	Dr. R. W. Sharp.
Bucyrus	Dr. A. H. McCrory.
*Burbank	H. E. Fouche.
Burkettsville	Dr. E. L. A. Brown.
*Burton	Dr. A. D. Warner.
*Butler	J. C. Teeter.
*Butlerville	Z. S. Maylott.
*Byesville	B. L. Nicholson.
*Cadiz	Dr. Wm. H. Lemmon.
Calais	O. S. Carpenter.
*Caldwell	Sylvester Rucker.
Caledonia	Philip Meister.
Cambridge	Dr. W. T. Ramsey.
*Camden	Dr. Geo. W. Homsher.
Canal Dover	Dr. A. W. Davis.
*Canal Fulton	John Ronan.
*Canal Winchester	Dr. John W. Shook.
Canfield	
*Cannelville	Dr. Chas. A. Dunn.
Canton	Dr. Frank DaHinden.
*Cardington	W. J. Purvis.
*Carey	Joseph F. Wonder.
*Carlisle, (Berne P. O.)	J. M. Bucker.
Carroll	Dr. C. A. Barrow.
Carrollton	Dr. R. E. Miller.
*Casstown	Dr. Foster D. Kiser.
Castine	Wirt Jenkins.
Catawba	Forest Mahan.
*Cecil	Dr. F. F. Demuth.
Cedarville	D. H. McFarland.
Celina	Dr. Frank E. Ayers.
*Centerburg	Dr. Willis O. Phillips.
Centerville, Gallia Co., (See Thurman P. O.)	
Centerville, Montgomery Co.	Lester Eagle.
*Chagrin Falls	John W. Steever.
*Chambersburg, (Eureka P. O.)	Dr. W. J. Fletcehr.
*Chardon	E. A. Johnson.

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* In lieu of a board of health.

Place.	Name.
*Chatfield	Samuel Lutz.
Chauncey	Dr. W. V. Sprague.
Chesapeake	C. E. Walters.
*Chesterhill	F. L. Mercer.
*Chesterville	Dr. W. C. Hodges.
*Cheviot	L. Scott Getzendanner.
Chicago	J. H. Jefferson, V. S.
*Chickasaw	John P. Kroeger.
Chillicothe	Dr. J. M. Hanley.
Cincinnati	Dr. J. H. Landis.
Circleville	Willis Henn.
Clarington	John E. Morill.
*Clarksburg	Floyd Noble.
*Clarksville	Frank Hoggatt.
Cleveland	Dr. Martin Friedrich.
*Cleveland Heights	Dr. Emil H. Stone, 5607 Euclid Ave., Cleveland.
*Cleves	Dr. Chas. W. Smedley.
*Clifton	Dr. Frank C. Adams.
*Clinton	Wm. J. Shondel.
*Cloverdale P. O. (Drusilla)	Dr. J. E. Stephan.
Clyde	Jesse Beard.
*Coal Grove	Dr. William Shattuck.
*Coalton	James Hensley.
*Coldwater	Dr. P. F. Weamer.
*College Corner	C. B. Howe.
College Hill, (Cincinnati)	
*Columbiana	Dr. John F. Mellon.
Columbus	Dr. Louis Kahn.
*Columbus Grove	Dr. N. Seaman.
*Commercial Point	William Hutslar.
Congress	Zeno D. Myers, R. D. No. 2, West Salem.
Conneaut	Dr. W. W. Wetmore.
*Continental	Daniel Noe.
Convoy	Dr. D. W. Leslie.
*Coolville	Dr. A. E. Lawrence.
*Corning	Wm. Anderson.
Cortland	Dr. B. G. McCurley.
*Corwin	C. W. Henderson.
Coshocton	Dr. F. M. Marshall.
*Covington	Geo. Flammer.
Crestline	Dr. C. A. Marquart.
*Creston	R. M. Ewing.
Cridersville	Arley Reichelderfer.
*Crooksville	Dr. Ellis I. Dozer.
*Croton P. O. (Hartford)	Dr. C. B. Hempstead.
*Crown City	Samuel Rouse.
*Cumberland	D. T. Phelps.
*Custar	Dr. Ivan L. Biggs.
*Cuyahoga Falls	William W. Scupholn.
*Cygnet	J. W. Driscoll.

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* In lieu of a board of health.

Place.	Name.
*Dalton	Dr. J. Coloman Haney.
Danville	Dr. T. E. Jefferson.
*Darbyville	J. A. Miller.
Dayton	Dr. Albert H. Lane.
*Deavertown	Dwight James.
Deersville	W. C. Birney.
Defiance	Dr. J. D. Westrick.
*DeGraff	Thos. H. Makemson.
Delaware	Dr. F. V. Miller.
Delhi, (Cincinnati)	
*Dell Roy	Dr. D. H. Schall.
*Delphos	Dr. Ezra Burnett.
Delta	Geo. A. Everett.
Dennison	G. H. Fowler.
*Deshler	William Earp.
*Dexter City	Benjamin M. McAtee.
*Dillonvale	Matthew Allison.
Donnelsville	Dr. Horace Heistand.
*Dover, (West Dover P. O.)	L. A. Williams.
*Doylestown	F. M. DeNise.
Dresden	Charles Bice.
*Drusilla, (Cloverdale P. O.)	Dr. J. E. Stephan.
*Dublin	Dr. G. M. Bargar.
*Dunkirk	Dr. C. C. McLaughlin.
*Dupont	T. R. Hart.
East Cleveland	Dr. E. F. Romig.
East Fairfield	Dr. G. H. Albright.
*East Linden	J. H. Pember.
East Liverpool	Dr. C. B. Ogden.
*East Palestine	Dr. J. M. VanFossan.
*East View, (Warrensville P. O.)	Charles C. Murfett.
*East Youngstown	Thos. E. Skelley.
*Eaton	Ora Acton.
Edgerton	Dr. D. S. Mortland.
*Edison	Dr. John H. Jackson.
Edon	Ed. Zwickey.
Eldorado	J. M. Kimmel.
*Elgin	Elmer Coil.
*Elida	Dr. S. A. Hitchcock.
Elmore	Marion Snyder.
Elmwood Place	Dr. E. T. Busching.
Elyria	Dr. George E. French.
*Empire	Raymond A. Hall.
*Enon	William Mitman.
*Euclid	Dr. H. B. Harper.
*Eureka P. O., (See Chambersburg)	Dr. W. J. Fletcher.
*Fairfield	M. W. Lasure.
*Fairport, (See Fairport Harbor P. O.)	Matti Hietanen.
*Fairview, (See Rocky River P. O.)	

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* In lieu of a board of health.

Place.	Name.
*Fairview, (Guernsey Co.)	Dr. H. J. Arnold.
*Farmersville	C. M. Boomershine.
*Fayette	Benjamin Stoner.
*Fayetteville	Henry E. Fitzpatrick.
*Felicity	W. W. Hayden.
Fern Bank, (Cincinnati)	
Findlay	Amos Beardsley.
Fletcher	Dr. I. C. Kiser.
*Florida	Dr. J. W. Cannan.
*Flushing	W. B. Harris.
Forest	Dr. W. H. Rabberman.
Fort Jennings	Ferd Heising.
*Fort Loramie P. O. (Loramie)	Fred Anthony.
Fort Recovery	Dr. W. C. Robeson.
Fostoria	W. N. Caldwell.
*Frankfort	J. B. Gordon.
*Franklin	John B. Miller.
*Frazeysburg	Dr. J. D. Flemming.
*Fredericksburg	Henry Snure.
Fredricktown	Dr. J. H. Norrick.
*Freeport, (Harrison Co.)	Isaac W. Reed.
Fremont	Dr. E. L. Vermilya.
*Freeport, Wood County, (See Prairie Depot, P. O.)	H. E. West.
Fultonham P. O., (Uniontown)	Dr. C. Z. Axline.
*Gahanna	J. R. Swickard.
Galion	Dr. E. D. Helfrich.
Gallipolis	Dr. J. T. Hanson.
Gambier	Robert Parker.
*Gann, (Brinkhaven P. O.)	William Hunter.
*Garrettsville	Charles D. Allen.
*Geneva	William H. Brown.
*Genoa	Edward Myers.
*Georgetown	Frank Bayne.
*Germantown	William Schaeffer.
*Gettysburg	C. J. Miller.
*Geyer	J. C. Hogan.
Gibsonburg	J. P. Tierney.
*Gilboa	Dr. F. B. Black.
Girard	W. D. Cunningham.
Glandorf	Dr. J. A. Harold.
*Glendale	Chas. Brewer.
Glenmont	J. C. Bresson, Sec.
Glouster	Frank Yocum.
*Gnadenhutten	Wm. M. Hamilton.
*Gordon	Dr. Charles Overholser.
*Grafton	John Bardon, Sr.
Grand Rapids	G. S. Burkett.
Grand River P. O., (Richmond)	H. S. Barton.
*Grandview Heights	John B. Young.

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* In lieu of a board of health.

Place.	Name.
*Granville	Dr. A. K. Follett.
Gratis, (Winchester,) Preble Co.	Fred Boesenberg.
Graysville	T. F. Mann.
*Green Camp	Frank J. Folk.
*Greenfield	Dr. J. D. Varney.
Greenspring	John Gallagher.
Greenville	S. A. Hawes.
*Greenwich	J. S. Davis.
*Gresham P. O., (See Linndale)	A. M. Pettis.
*Grove City	Ed. F. Darnell.
Groveport	Dr. C. R. Clement.
*Grover, (See Tiltonville)	Matthew Darrah.
*Grover Hill	T. Goliver.
*Hamden	Albert Knox.
*Hamersville	Dr. George E. Rouse.
Hamilton	Dr. A. L. Smedley.
Hamler	George Bell.
*Hanford	W. M. Thompson, 1937 E. Main St., Columbus, O
Hanging Rock	Joseph Kinkaid, Sr.
*Hanover	Dr. W. L. Evans.
Hanoverton	Newton Steller.
Harpster	
*Harrisburg	Albert Deyo.
Harrison	Abe Loos.
Harrisville	Dr. J. C. McClester.
*Harrod	Michael Leatherman.
*Hartford, (See Croton P. O.)	Dr. C. B. Hempstead.
Hartwell, (Cincinnati)	
Harveysburg	W. A. Haines.
*Haskins	William H. North.
*Haviland	Jas. T. LeFevre.
Hayesville	W. L. Stover.
*Hebron	Noah Storts.
*Helena	Robert McCone.
Hemlock	Dr. R. W. Miller.
Hicksville	B. L. Kelsey.
*Higginsport	Charles Love.
*Highland	George W. Luker.
*Hilliards	Dr. J. W. Reason.
Hillsboro	Dr. H. A. Russ.
Hiram	B. S. Dean.
*Holgate	J. H. Spencer.
*Hollansburg	Dr. A. W. Meek.
*Holloway	O A. VanFossen.
Holmesville	C. W. McClelland.
*Hopedale	W. H. Beckett.
*Hoytville	Dr. Dan B. Spitler.
*Hubbard	Dr. W. H. Button.
Hudson	Dr. H. C. Coolman.
*Huntsville	Dr. Frank A. Richardson.
*Huron	Robert Day.

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* In lieu of a board of health.

Place.	Name.
*Idlewood, (See Warrensville P. O.)	William C. Penty.
Ironton	Dr. E. E. Wells.
Ithaca	Dr. L. R. Emerick.
Jackson	John Reed.
*Jacksonboro, (West Middletown)	Isaac Williamson.
*Jackson Center	Dr. John M. Carter.
*Jacksonville	Henry Wolfe.
*Jamestown	Al. Zeiner.
*Jefferson	W. S. Andrews.
*Jeffersonville	Dr. Emmett Fayen.
Jenera	C. H. Heldman.
*Jeromeville	Dr. George W. Whitney.
*Jerry City	D. D. Kidd.
*Jerusalem	W. A. Jones.
*Jewett	Dr. W. L. England.
Johnstown	Dr. E. S. Rutledge.
Junction City	Dr. F. J. Crosbie.
*Kalida	Dr. J. D. Waterson.
Kelly's Island	Geo. P. Schardt.
*Kenmore	B. W. Swigart.
*Kennedy Heights, (Kennedy P. O.)	Dr. G. F. Schwenkmeyer.
Kent	F. H. Vickers.
Kenton	L. A. Pugh.
*Kettlerville	Dr. O. O. Lemaster.
Killbuck	William C. Stout.
*Kimbolton	W. G. Alloway.
Kingston	E. B. Sims.
*Kirby	Dr. E. E. Burns.
*Kirkersville	George Carrico.
Lafayette	Dr. N. Sager.
LaGrange	Dr. J. W. Lindsey.
Lakeside	Ralph L. Waters, M. D.
Lakeview	F. M. Smith.
Lakewood	Dr. A. E. McClure.
Lancaster	Dr. J. P. Hershberger.
*LaRue	M. H. Leslie.
*Latty	H. C. Smith.
*Laura	W. C. Williamson.
Laurelville	Dr. W. D. Cain.
Lebanon	H. B. Stokes.
Leesburg	Dr. W. B. Roads.
*Leesburg, (Leesville P. O.) Carroll Co.	W. C. Sharp.
*Leesville P. O. (Leesburg)	W. C. Sharp.
Leetonia	Dr. O. A. Rhodes.
*Leipsic	Dr. Wiley D. Hickey.
*LeRoy	Rodney Russell.
Lewisburg	A. N. Cox.
Lewisville	V. E. Dillon.

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* In lieu of a board of health.

Place.	Name.
*Lexington	Dr. Henry H. Smith.
*Liberty Center	L. K. Allen.
Lima	Dr. A. L. Jones.
*Limaville	S. E. Beltz.
*Linden Heights	John L. Mulligan.
*Linndale, (Gresham P. O.)	A. M. Pettis.
*Lisbon	William Geller.
*Lithopolis	E. E. Myers.
*Lockbourne	S. D. Graumlich.
Lockington	S. S. Gabriel.
*Lockland	Valentine Harting.
*Lodi	A. W. Kinney.
*Logan	J. H. Carnes.
*London	Dr. John W. Parker.
Lorain	Dr. Edw. V. Hug.
*Loramie, (Fort Loramie P. O.)	Fred Anthony.
*Lore City	S. W. Dugan.
Loudonville	Walter S. Young.
Louisville	Dr. F. W. Schilling.
*Loveland	Dr. C. Haarlammert.
Lowell	A. J. Thompson.
*Lowellville	Rodger Horn.
*Lower Salem	Joseph Miller.
*Lucas	A. E. Swain.
*Lynchburg	Wm. H. Hopkins.
*Lyons	Dr. G. R. Salsberry.
*McArthur	George W. Specht.
McClure	E. E. Britton.
*McComb	James H. Byal.
McConnelsville	Aurelius Gorrell.
*Macedonia	P. B. Seacoy.
*McGuffey	R. H. Boyd.
*Macksburg	Samuel H. Dyer.
*Madeira	Dr. Wm. Knight.
*Madison	Dr. Wm. Snearer, Jr.
Madisonville, (Cincinnati)	
Magnetic Springs	J. H. Scott.
*Magnolia	P. H. Blazer.
*Maineville	James G. Hill.
Malinta	W. M. Hess.
Malta	John Pennell.
*Malvern	Dr. J. A. Rheil.
Manchester	Dr. Wm. J. Morgan.
Mansfield	Dr. Guy T. Goodman.
Mantua	E. H. Knowlton, Clk.
Marble Cliff	Dr. McKendree Smith.
*Marblehead	A. H. Elwell.
*Marengo	T. E. A. Eakens.
Marietta	Dr. F. S. McGee.
Marion	Dr. D. O. Weeks.

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* In lieu of a board of health.

Place.	Name.
*Marseilles	Dr. E. S. Jones.
*Marshallville	J. J. Frase.
*Martinsburg	Dr. W. E. Shrontz.
Martin's Ferry	Fred White.
*Martinsville	J. L. Loney.
*Marysville	C. W. Hoopes.
Mason	Dr. M. H. Houseworth.
Massillon	Dr. T. Clarke Miller.
*Matamoras, (New Matamoras P. O.)	Jesse D. Cline.
Maumee	William D. Clewell.
Mechanicsburg	Dr. H. Dickson.
*Medina	F. L. Harding.
*Melrose	J. H. Harmon.
*Mendon	John Krugh.
*Mentor	Dr. J. W. Lowe.
Metamora	George Potter.
*Middlefield	Dr. F. S. Clapp.
Miamisburg	W. Burnett Weaver.
Middle Point	Dr. W. H. Beery.
Middleport	Dr. D. S. Hartinger.
Middletown	Dr. Geo. D. Lummis.
Midland, (Midland City P. O.)	Dr. A. B. Martin.
Midland City P. O. (Midland)	Dr A. B. Martin.
Midway, (Sedalia P. O.)	
*Mifflin	George Fulmer, R. D. No. 8. Ashland.
*Milan	Henry G. Loher.
*Milford	Dr. F. C. Curry.
*Milford Centre	Oscar Miller.
Millbury	Dr. C. M. Diebert.
Milledgeville	Otto Smith.
*Miller City	J. M. Dobmeyer.
*Millersburg	Dr. D. S. Olmstead.
*Milton, (West Milton P. O.)	Dr. A. H. Haworth.
*Miltonsburg	Chester Reller.
Milton Center	
Mineral City	Dr. C. H. Sawyer.
*Mineral Ridge	Edward Blunt.
*Minerva	Elmer E. Fultz.
*Mingo Junction	Chauncey D. Jacobs.
*Minster	Joseph Brunegraff.
*Mogadore	Wm. Saxe.
*Monroe	James F. Linn.
*Monroeville	Dr. E. R. Kreider.
*Montezuma	George Wade.
*Montgomery	Dr. C. W. Ekermeyer.
Montpelier	Dr. J. V. Lesnet.
*Morral	Fred McCumber
*Morristown	Joshua DeWees.
*Morrow	Dr. Leonard Mounts.
Moscow	Dr. W. S. Purkhiser.

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* In lieu of a board of health.

Place.	Name.
Mt. Airy, (Cincinnati)	
*Mt. Blanchard	C. M. Wolford.
Mt. Cory	E. C. Cramer.
Mt. Eaton	J. J. Schafly.
*Mt. Gilead	Dr. Geo. H. Pugh.
*Mt. Healthy	Dr. Lafayette Neufarth.
*Mt. Orab	Henry Hayes.
Mt. Pleasant	Thomas O. DeVault.
*Mt. Sterling	Dr. R. B. Wittich.
Mt. Vernon	Dr. H. W. Blair.
Mt. Victory	Dr. A. W. Titsworth.
Mt. Washington, (Cincinnati)	
*Mowrystown	D. W. Hunter.
*Murray City	Dr. John H. Elias.
Mutual	C. M. Goul.
Napoleon	Roy R. Beck.
*Nashville	C. D. Roach.
Navarre	John Bailiss.
Nellie	Sam Snellenberger.
Nelsonville	Dr. J. M. Hyde.
*Nevada	Dr. S. S. Barrett.
*Neville	Chas. Stratton.
*New Albany	F. M. Heischmann.
New Alexandria	J. R. Waugh.
Newark	Dr. W. H. Knauss.
New Athens	Dr. A. B. Tubbs.
*New Berlin	James R. Brown.
*New Bloomington, (Agosta P. O.)	W. H. Carey.
*New Boston	Dr. W. G. Cheney.
*New Bremen	Dr. G. A. Havemann.
Newburg Heights, (Willow P. O.)	Dr. F. E. Farrar.
*New Carlisle	D. F. Akers.
Newcomerstown	F. B. Angle.
*New Concord	Orrie V. Shepherd.
*New Holland	Thos. Harris.
*New Knoxville	Dr. H. E. Fledderjohann.
*New Lebanon, (Potsdam P. O.) Miami Co.	T. S. Arnett.
*New Lebanon, Montgomery Co.	Fred Purnhagen.
*New Lexington	C. D. Anders.
New London	Wm. H. Whitney.
*New Madison	Jacob D. Tice.
*New Matamoras P. O. (Matamoras)	Jesse D. Cline.
*New Paris	Dr. C. A. Hawley.
New Philadelphia	Dr. Geo. H. Peck.
New Richmond	Dr. D. M. Roberts.
*New Riegel	Frank N. Dell.
*New Straitsville	Wm. C. L. Hall.
*Newton Falls	Levi Curtis.
*Newtonsville	Auburn Bigam.

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*In lieu of a board of health.

Place.	Name.
*Newtown	Dr. C. R. Campbell.
*New Vienna	Dr. E. W. Brown.
*New Washington	George B. Wolfe.
*New Waterford	A. J. Hayes.
*New Weston	Eli Sherrets.
*Ney	Dr. P. M. Lehman.
Niles	Dr. W. A. Werner.
North Baltimore	Dr. G. W. Foltz.
*North Bend	Sylvester Rudisell.
*North Dover P. O. (Bay)	Geo. L. Osborn.
*Northfield	C. S. Machnort.
*North Kingsville	W. H. Bugbee.
North Lewisburg	John A. Moore.
*North Olmsted	B. C. Austin.
North Randall	Thos. J. Redmond.
*North Robinson	J. G. Fetter.
Norwalk	J. E. Davis.
*Norwich	Allen I. Mercer.
Norwood	Dr. Frank Perry.
Oak Harbor	Dr. E. B. Huyck.
*Oak Hill	William Jenkins.
Oakley, (Cincinnati)	
*Oakwood, (Paulding Co.)	Martin Shisler.
Oakwood, (Montgomery Co.)	Dr. H. H. Herman.
Oberlin	R. T. Paden.
*Octa	Wm. D. Hausman.
Ohio City	C. A. Morehead.
*Old Washington P. O., (Washington)	Jacob Shipman
*Olmsted Falls	H. B. Northrop.
*Orangeville	Dr. W. C. Holbrook.
Orrville	Dr. A. A. Brooks.
*Osborn	W. B. Morrison
Osgood	
*Osnaburg	Joseph Davenport
*Ostrander	George P. Liggett.
*Ottawa	Dr. A. F. Sheibley.
*Ottoville	Dr. John F. Ockuly.
Otway	Simon Crow.
*Owensville P. O., (Boston)	Dr. W. E. Leever.
*Oxford	Dr. Chas. O. Munns.
Painesville	Frank L. Kerr.
*Palestine	H. G. Monke.
*Pandora	Dr. Harry A. Neiswander.
*Pataskala	Dr. Loyd M. Bell.
Patterson	Benjamin Trobridge.
*Paulding	Harry Tresse.
*Payne	Dr. G. W. Bodey.
*Peebles	D. M. Cobler.
Pemberville	August Stein.

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* In lieu of a board of health.

Place.	Name.
*Peninsula	B. F. Sovacool.
Perrysburg	Dr. M. H. Bowers.
*Perrysville	Sherman Nigh.
Phillipsburg	Elias Haines.
Philo P. O. (Taylorsville)	Benjamin Foreman.
*Pickerington	Frank Bish.
*Piketon	S. H. Cutler.
*Pioneer	W. R. Norris.
Piqua	Dr. J. H. Lowe.
Pitsburg. P. O. (Arnettsville)	Dr. J. O. Starr.
*Plain City	J. M. White.
*Plainfield	Melville C. Woods.
*Pleasant City	J. F. Secrest.
Pleasant Hill	Dr. Judson Teeter.
Pleasant Ridge, (Cincinnati)	
*Pleasantville	R. T. Parido.
Plymouth	Dr. Chas S. Walker.
Poland	Dr. C. R. Justice.
*Pomeroy	Dr. L. G. Gribble.
*Polk	Dr. W. H. Reinhart.
*Portage	J. L. Williams.
Port Clinton	Dr. W. H. Lausten.
*Port Jefferson	D. J. Cargill. D. V. S.
Portsmouth	Dr. W. W. Smith.
Port Washington	Dr. W. F. Demuth.
*Port William	Newton J. Conklin.
*Potsdam P. O. (New Lebanon. Miami County)	T. S. Arnett.
Powhatan Point	P. J. Sauer.
*Prairie Depot. (Freeport)	H. E. West.
Proctorville	Dr. R. E. Atkinson.
Prospect	Dr. C. M. C. Thomas
Put-in-Bay	Adam Heidle
*Quaker City	Jasper Eagan.
*Quincy	Dr. N. V. Speece.
*Racine	Dr. John Philson.
*Rarden	Dr. F. G. Watchtendorf.
Ravenna	**Henry J. Shreader.**
*Rawson	Michael Smith.
*Reading	Nicholas I. Revermann.
*Rendville	Wm. H. Shelton.
*Republic	Jesse W. Seitz.
*Reynoldsburg	David Benadum.
*Richmond. Jefferson Co.	John Oscar Orwick.
Richmond. (Grand River P. O.) Lake Co.	H. S. Barton.
Richwood	John Aller.
*Ridgeway	Dr. E. E. Lynch.
*Ripley	Dr. A. W. Francis.

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* In lieu of a board of health.

Place.	Name.
*Rising Sun	H. M. Raub.
*Rittman	Wm. H. Hamlin.
*Rochester	D. C. Mann.
*Rock Creek	J. E. Gladding.
Rockford	Geo. Kimble.
*Rockport, (West Park P. O.)	Dr. Ira B. Gordon.
*Rocky Ridge	Sylvester McNutt.
*Rocky River	Jacob Burkemer.
*Rogers	J. E. Baker.
*Rome, (Stouts P. O.)	N. C. Cattell.
*Roscoe	Samuel T. Dobson.
*Roseville	W. H. Garrett.
*Rossburg	C. W. Wheeler.
Roswell	Dr. R. A. Marquand.
Rushsylvania	Wm. C. Newland.
*Rushville	P. F. Benadum.
Russellville	M. Breen.
*Rutland	Dr. W. H. Chase.
St. Bernard	Dr. A. C. Krumpelbeck.
St. Clairsville	Dr. S. L. West.
St. Henry	Dr. J. A. Schirack.
*St. Louisville	R. K. Walton
St. Marys	Dr. Chas. McKee.
*St. Paris	Dr. H. B. Hunt.
*Sabina	Geo. C. Barns.
Salem	Dr. E. J. Schwartz.
*Salesville	Joseph R. Dement.
*Salineville	Dr. J. A. Sapp.
Sandusky	Dr. Henry Graefe, Jr.
*Sarahsville	Jonah Grimes.
*Sardinia	Chas. B. Yearsley.
*Savannah	Simon Stahl.
Sayler Park, (Cincinnati)	
Scio	Dr. G. D. Custer.
Scott	Dr. F. C. Duckwall.
*Seaman	Dr. J. W. Irwin.
Sebring	Chas. Baumgartner.
Sedalia P. O. (Midway)	
*Sekitan, P. O. (Addyston)	Louis Buckwalt.
*Senecaville	Frank Morrison.
*Seven Mile	Dr. H. H. Marsh.
*Seville	E. G. Miller.
*Shadyside	Dr. J. C. Archer.
*Shaker Heights	Geo. W. Wasser, D. D. S., 1102 N. England Bldg., Cleveland, Ohio.
*Shanesville	Chas. E. Black.
*Sharonville	Harry McGren.
*Shawnee	Dr. Michael O'Farrell.
Shelby	Dr. M. T. Love.

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* In lieu of a board of health.

Place.	Name.
Sherodsville	
Sherwood	Dr. H. C. Lindersmith.
*Shiloh	John M. Hamilton.
*Shreve	James H. Andress.
Sidney	Wm. C. Wyman.
*Silverton	Dr. A. A. Sprague.
*Sinking Springs	John W. Coran.
*Smithfield	Dr. A. H. Kreager.
*Smithville	D. D. Hartzler.
Somerset	Michael Clouse, M. D.
*Somerville	Wm. H. McFall.
South Bloomfield	H. Roese.
*South Charleston	S. W. Coss.
South Lebanon P. O.	Dr. V. T. Reynolds.
South Newburg	Dr. A. J. Simpson, 9001 Broadway, Cleveland, O.
*South Point	U. M. Davidson.
South Salem	
South Solon	Ervin Corbett.
*South Vienna P. O. (Vienna)	John Copeland.
*South Webster	W. H. Leive.
*South Zanesville	F. R. Bowers.
Sparta	Dr. T. A. Huggins.
Spencerville	William A. Hayes.
*Springboro	J. B. Haines.
Springfield	Dr. I. E. Seward.
*Spring Hill	Oliver Everett.
*Spring Valley	Dr. R. W. Smith.
*Stafford	Dr. Walter Mason.
Steubenville	Theodore W. Smith.
*Stockport	Dr. T. J. Lyne.
Stone Creek	Dr. D. E. Rausch.
*Stouts P. O. (Rome)	N. C. Cattell.
Strasburg	Dr. J. C. Schutzbach.
*Stratton, (Empire P. O.)	Raymond A. Hall.
Struthers	D. C. Moore.
*Stryker	John E. Meek.
Sugar Creek	Fred Cambell.
*Sugar Grove	S. F. Sheets.
Summerfield	Dr. R. B. Taylor.
Sunbury	J. A. Wilson.
Swanton	B. F. Mills.
*Sycamore	Dr. I. B. Gibbs.
*Sylvania	A D. Lewis.
*Tarlton	Ed. S. Ballard.
Taylorsville, (Philo P. O.)	Benjamin Foreman.
*Terrace Park	Dr. John K. Scudder.
*Thornville	Dr. O. J. Letherman.
Tiffin	Dr. J. A. Gosling.
*Tiltonville P. O. (Grover)	E. E. Garner.

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Tiro	Dr. W. H. Guiss.
Toledo	Dr. R. Becker.
*Tontogany	Andrew F. Sautter.
*Toronto	Joseph Chaine.
Trenton	Edward Kopp.
*Trimble	Harvey Wyne.
*Trotwood	George C. Bunnell.
Troy	Dr. J. B. Francis.
*Tuscarawas	J. A. Meese.
Uhrichsville	F. McCullough.
Union City	Ed. R. Thuston,
Uniontown, (Fultonham P. O.)	Dr. C. Z. Axline.
*Unionville Center	G. M. Bailey.
*Uniopolis	Andrew J. Blank.
*Upper Sandusky	Dr. Otto Carl Stutz.
Urbana	M. L. Smith.
*Utica	Wm. A. Hobbs.
Van Buren	F. M. Say.
*Vandalia	David Bennert.
Van Lue	Mahlon Breitigan.
Van Wert	Dr. C. G. Church.
Venedocia	
Vermilion	Henry Schmoll.
*Verona	Dr. W. I. Christian.
Versailles	Dr. C. F. Ryan.
*Vienna (South Vienna P. O.)	John Copeland.
*Vinton	Dr. J. C. Strausbaugh.
*Wadsworth	Thomas J. Lucas.
Waldo	Dr. E. J. Marsh.
Wapakoneta	Dr. C. L. Mueller.
Warren	Dr. Geo. N. Simpson.
*Warrensville P. O. (Idlewood)	William C. Penty.
*Warsaw	Dr. D. W. Meredith.
*Washington, (Old Washington P. O.)	Jacob Shipman.
Washington C. H.	Will Bradfute.
*Washingtonville	William T. Smith.
*Waterville	Dr. H. L. Babcock.
*Wauseon	C. B. Onsted.
*Waverly	Thomas H. McCann, M. D.
*Waynesburg	William Waggoner.
Waynesfield	Amos Shockey.
Waynesville	Dr. Thos. Sherwood.
*Wellington	Salonias A. Williams.
Wellston	James R. Ward.
Wellsville	Dr. M. C. Tarr.
*West Alexandria	John P. Stock.
West Cairo	Ray Cook.

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*In lieu of a board of health.

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West Elkton	A. W. Y. Conarroe.
Western Star	Fred Becker, Wadsworth, R. F. D. No. 2.
Westerville	Dan Dusenberry.
West Farmington	Albert Ostrom.
West Jefferson	W. S. McWilliams.
West Lafayette	W. C. Wiggins.
*West Liberty	Dr. A. C. Brindle.
*West Leipsic	Joshua Shaffer.
*West Manchester	J. F. Monebrake.
*West Mansfield	Dr. G. F. Plotner.
*West Middletown P. O., (Jacksonboro)	Isaac Williamson.
West Millgrove	
*West Milton P. O. (Milton)	Dr. A. H. Haworth.
Weston	J. C. White.
*West Park P. O. (Rockport)	Dr. Ira B. Gordon.
West Rushville	William Kerr.
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West Union	A. S. Doak.
*West Unity	Samuel Ozmun.
*Wharton	T. F. Watson.
*Whitehouse	A. D. Disher.
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*Williamsburg	Dr. J. P. Allen.
Williamsport	Dr. D. H. Marcy.
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*Willshire	Dr. J. F. Shaffner.
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*Winchester	John R. Shrofe.
Windham	H. J. Higley.
*Woodsfield	Louis Hoeffler.
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Woodville	Dr. F. G. Blanchard.
Wooster	Dr. A. C. Knestrick.
*Worthington	T. E. Albert.
Wren	G. W. Dull.
Wyoming	Geo. H. Eversman.
Xenia	Dr. A. C. Messenger.
Yellow Springs	Jasper Beal.
*Yorkshire	Agen Wasson.
Youngstown	Dr. H. E. Welch.
Zaleski	Dr. A. A. Boal.
*Zanesfield	Dr. O. H. McDonald.
Zanesville	Dr. Simeon Kelly.
*Zoar	Edgar G. Ruof.

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* In lieu of a board of health.

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